CHEMICAL INDUSTRIES

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Technological Progress and Chemical Prices

DISCUSSING technological progress before the British Association of Science, B. F. Hall pointed out that, within the past decade economists have learned to distinguish between risks and uncertainties. "A risk," he continued, "such as that of a shipwreck or a fire, is a recurrent circumstance, and consequently capable of quantitative measurement and actuarial treatment. Uncertainties, however, are undetectable and incapable of quantitative measurement; they arise out of the freedom of the mind and the continual possibilities of change."

As a generalization this is true. But in chemical industry, it is only a half truth. For the chemical industry has learned to count upon the certainty of technological improvement in processes and materials. So swift and sure has this progress become that it is quite out of the uncertainty class, and has become a definite risk.

A distinguishing feature of this industry's present position, in this country, is that chemical prices are below the pre-war average, and while we have been bemoaning during the whole of the post-war period the bitter competition causing this deflation, nevertheless viewed broadly low chemical prices, compared with other materials, have been, during the depression period, a stimulator of chemical sales and a strong incentive for consuming industries to use more chemical processes and more synthetic materials. These lower prices are the result of passing along to the consumer the technological improvements of an industry peculiarly open in competition and broad-minded in policies. In this way, the risks of technological progress, which are so gravely feared in financial and other industrial circles, become an advantage to an industry attuned to change.

Plainly, these chemical price policies, adopted in part voluntarily and in part forced by competition, are diametrically opposed to much of the philosophy of restricting production and inflating prices. The sound condition of our chemical companies today cannot, it is true, be wholly credited to the fact that comparatively chemical prices are lower than those of other industrial commodities, nevertheless the industry is a telling example of the advantage of a thoroughgoing deflation.

Responsible Leadership President Roosevelt's great personal popularity was the single issue clearly proved by the recent election. While the Republican leaders find consolation in the fact that the total Democratic vote fell off more than fifteen per cent. and that another such victory would restore them to decisive control over Congress, nevertheless it is as plain that, all over the country and regardless of party lines, men of most conflicting policies and very different capabilities were elected on the sole argument "Vote for me and Roosevelt."

The President's fine personal triumph implies a responsibility of leadership which he has escaped during his first half-term. This is fortunate for the country, since never was leadership more sorely needed, and a great practical gain will result, if at a time when party responsibility has all but vanished, personal responsibility can be fixed.

To date the President's leadership has inspired action—swift, bold action adopted, as he has frankly confessed, as experiments. Many of these have been prompted by mixed motives. Some of the experiments have been so contradictory as to cancel each other. Most of them have flatly repudiated the historical principles of the Democratic party, and several are highly repugnant to the ancient faiths of the Republic. Very few of these bold acts, however, give evidence of having been thought through to logical conclusions.

No merit attaches to an experiment unless it reveals new knowledge, and the President must by now have learned much of practical value from experience. What is now needed is a plan which will embody the ideals of the New Deal worked out carefully upon the basis of the facts revealed by the trial and error methods of the past two years, and the President has a glorious chance at the moment to furnish a leadership in constructive thought which will capitalize not only his popularity, but also his program.

As one of the warmest friends of the Administration, Walter Lippmann, has recently pointed out: "I am, therefore, in favor of a steady, considered demobilization of the emergency powers, and, above all, of the uncritical mood which prevailed in the emergency. We have got as far as we can by audacity and improvisation, and we need, I believe, definiteness in place of indefiniteness, regular and orderly procedure, and a clear sense of what are the rules of the game. We must decide, in fact, what is worth salvaging in the New Deal."

Market Highlights The '35 contract season, now more than half over, has so far been a satisfactory one. The highlights to date can be summarized briefly: chlorine producers will get more for their product next year and who will say that they do not deserve to do so. Anhydrous ammonia continues to display the firmness that has characterized this item for several years. Renewal of zinc oxide contracts at present levels would seem to indicate the strong possibility of the other important pigments remaining firm. With one of the three new southern alkali plants in production and the other two close to the completed stage, many alkali buyers were of the opinion that another disastrous "price war" was more than a possibility. With very constructive foresight this has been completely avoided so far, and instead of a demoralized market with neither seller or buyer knowing where they stand, the situation is one of comparative stability and everybody is the happier and better off for it. One is struck with the weakness in the acetate of lime market, but this situation is involved, with a number of side angles. Rather strange was the delay in announcing bichromate prices, but the contract season generally has been a late one and it is, perhaps, just as well that this is so.

Consumers of cottonseed oil (not the speculators) are viewing with alarm continued spectacular price advances. The economics of the situation will very shortly take command, for there is a natural competitive price for each one of the oils and beyond that lies trouble. The Government's attempt at artificial control of naval stores prices cannot be termed a huge success. For the best part of November buyers of gum rosin and spirits turpentine have virtually been "on strike," and quotations are largely nominal. It is hard to believe that Washington and the leaders of the industry fail to appreciate that foreign markets are vital; that artificial prices are simply a "gilt-edge" invitation to take away our enviable but not impregnable position. To say that the A.A.A. control of production and the lending of money to carry stocks, is preventing complete market demoralization, is rather far-fetched.

Fortunately improved business sentiment comes at a time when chemical manufacturers are seeking contract renewals. Contrary to seasonal trend, November tonnages are more than likely to be better than October. We should enter the new year with a fairly stable price structure upon which to build the road to recovery.

Budget Control

By V. R. Bechtel

Budget Director, American Cyanamid Company

I

Organizing Cyanamid's Budget Control

BUDGET control for the chemical industry, or any other industry, is as old as industry itself. There is nothing new, mysterious or difficult to understand about what we call control of a unit of industry through use of operating budgets. Modern scientific budget control is simply a development in budget control which has of necessity kept pace with the growth of industry itself.

Budget control has always been applied in the operation of any business. The proprietorship form of business had its budget control in the constant and close contact and mental planning of its owner. Nothing more was warranted or needed. The business was small, serving a limited clientele, with distribution of its products or service limited to a local neighborhood which could be economically served by the limited transportation facilities then available.

Invention, particularly of modern transportation and communication systems, has literally forced business enterprises to grow from individual proprietorships to the present company and corporation size with wide ranges of products, almost unlimited in geographical distribution, requiring enormous investments of capital and managed by a highly trained and specialized personnel. In no other manner could the present generation enjoy the conveniences and comforts which have been brought within reach of such a large percentage of the population of the world and particularly of our country. There is still and always will be a place for the individual to operate his own business. Economic developments in business have, however, resulted in sharper drawn lines between the types of business which can be profitably operated by one or a few persons and those which require more capital and more managing talent than can be supplied by individuals.

With the rapid growth in the size and complexity of business, it has become increasingly necessary for management to develop records which can be used to assist, but never to replace, first hand personal contact and knowledge of management in the operation of a business enterprise. Development of accounting methods and budget control procedure has therefore been forced to keep pace with the needs of business itself.

While accounting and budgeting are closely related, the purpose of each is specific and separate from the other.

"Accounting" is the recording of results from operations which have already happened and to serve its purpose must be promptly and accurately completed, and results presented in a concise and understandable manner supported with detail which will enable management to secure an intelligent picture of what has happened in any phase of the business by whatever accounting periods may be decided as most fitting to the business.

"Budgeting" is a statement of policy by units of responsibility in terms of future accounts. Budgets are necessarily prepared in advance of actual happenings and may well be termed the compass which is being used to steer the Ship of Industry.

The American Cyanamid Co. was originally a one-product company, being the sole producer and distributor in North America of "Cyanamid." From this single product has grown a line of important fertilizer materials produced in modern plants including one plant equipped with the two largest electric furnaces in the world. The first important addition to the fertilizer line of products was a line of mining chemicals with world wide distribution and broad uses.

Beginning in 1928 and 1929 and continuing to this date, the American Cyanamid Co. has carried out an aggressive diversification program, taking in many important units in the dye, heavy and fine chemicals, explosives, pharmaceutical, synthetic resins, building material and plant construction lines. The company is a partner with Pittsburgh Plate Glass Co. in the ownership of a huge, modern alkali plant at Corpus Christi, recently in operation. With this heavy expansion program occurring almost at the beginning of the depression, serious problems have had to be met and overcome to enable the company progressively to improve its competitive position as well as maintain a strong

balance sheet position and carry forward a large construction program to improve its plants, build new ones for constantly increasing demands for old as well as for new lines of products, and to provide centralized facilities for coordinating the producing activities of many of the units whose operations have been absorbed during the past five years.

Foreseeing the need for an improved budget control the management decided in 1929 to install a separate department to develop the budget control work, which had been practised for several years in a modest way, to meet the greater needs of the business which was rapidly becoming larger and more complicated by its diversity.

Set-up of Budget Organization

It has been my pleasure to have had the responsibility of the development of this modern control, in the capacity of Budget Director since 1929. We do not pretend that we have even closely reached perfection nor that we have developed anything unique or better than is practised by any company which has similar problems. We believe we have simply applied the rule of common sense and are happy to recount how we have approached our problems, also to outline briefly some of the mechanism used in building up and utilizing our budget control figures in the hope that we may be helpful to our many friends in the chemical and other industries.

On joining the company I spent some two months studying in detail, its history and organization, particular attention being given to the expansion program already accomplished and yet under consideration, getting acquainted with the organization, and having a first hand look at the plants. Through previous experience with one of the large chemical companies in similar work, I had a background of knowledge of a chemical business and a general knowledge of the industry as a whole. Reviewing several years of accounting records in considerable detail and for the entire history in summary form took up a substantial part of this initial period. I was particularly interested in the methods of accounting both from a procedure and a principle standpoint; the routine through which construction and other out-of-ordinary appropriations were made, and the line of authority to make expenditures which resulted from a change in operating policy or a desire on someone's part to expend small or large sums of the company's cash.

A procedure of operation was then drawn up as a basis on which the budget control work would function, having in mind the manner in which the company was accustomed to function, also to the needs of the enlarged and more diversified organization and operations.

A committee was appointed by the company to be known as the "Budget Committee" to whom the Budget Director would report and through which he would function. This Committee consisted of four major executives who were then the senior Vice President, as Chairman of the Committee, the Vice President in charge of Sales, the Vice President in charge of Technical Development, and the Treasurer. Regular meeting dates at 10:30 each Wednesday were set up for the Committee. The decision of the Committee in all matters under its jurisdiction to be final with exceptions of items involving important company policies or in a case where a decided difference of opinion might develop between the Budget Committee and other authoritative committees, in which case the problem would be referred to the President either for advice or decision.

A meeting of the key executives of all operating units and/or subsidiaries was called by the President to discuss in detail the plan for establishing and operating control budgets. Criticisms and suggestions were asked. Many constructive suggestions were received at this meeting and others were made later after the procedure was studied in detail and discussed with several who could not be present at this special meeting. In principle, the plan was recognized as essential to the success of the company and was welcomed by all executives.

The procedure as set up provided in principle, as follows:

1. Installation of standardized operating and cash budgets in accordance with procedure developed and on standardized forms to be provided by the Budget Director.

2. Control of operations through operating and cash budgets to insure the most profitable and economical use of capital and assets available to the management. This control to be operated in such manner as to reflect the full judgment and proven experience of executives responsible for operations of each subsidiary or operating unit combined with that of the central Budget Committee.

3. The authority and responsibility for the preparation and carrying out of the program for each subsidiary or operating unit as expressed in their budgets rested with the chief executive of each company or unit. The chief executive in each case selecting a man within his organization to act as contact man with the Budget Director and to be responsible for preparation of the local budgets and all details in connection with their use. Each budget to be approved by the central Budget Committee before becoming effective.

4. The Budget Director was assigned full responsibility to develop all matters relating to operating and expenditure control and to present facts and data to the central committee in a manner to enable intelligent and prompt action. In addition, the Budget Director was made responsible for providing facts to evidence the manner and extent to which budgeted results are attained.

5. All problems affecting operating and cash budgets requiring action of the central committee to be presented through the Budget Director.

6. The Budget Director to deal directly with or pass to the central commttee for action or decision each problem in accordance with his best judgment or as he may be specifically instructed by the committee. Alle records, accounts, costs, contracts, etc. considered necessary by the Budget Director for the proper performance of his work to be made available on request to each company or unit.

7. The Central Committee to act jointly with the chief executive of each company or unit as a coordinating body to keep

expenditures and cash requirements in balance with cash available and in line with profits of each unit and the company as a whole and to assist in realizing reasonable profits on all business transacted.

8. Operating and cash budgets to be prepared and submitted for approval prior to the beginning of each fiscal year with the first six months by months and the last six months in total. Revisions to be made when changes in business outlook or operating policy requires, but in any case at the end of the first six months' period when the last half year is to be revised and broken down by months.

9. Changes in operating policies affecting in an important way, any part of the operating or cash budget to be presented for approval and for amendment of the budget. Full reasons for the change and results expected to be clearly and fully stated. Such changes to include adding new products or lines, new or enlarged sales activities, increase in department personnel, etc.

10. Appropriations for fixed capital additions by construction or purchase, purchase of plants, assets or business of an outside company, sale or exchange of assets or business owned to be presented to the central Budget Committee for approval before commitment is made.

11. Perhaps the most important function of the Budget procedure is in the interpretation of actual results in comparison with results anticipated in the budget and in providing proof of accomplishment on all important phases of operations and on all important cash outlays. The Budget Director was assigned the responsibility of providing the necessary data and studies for this purpose to the central Budget Committee and to the other major executives of American Cyanamid Co. and each subsidiary or operating unit.

In the development of detail procedure and standardized forms for use in preparing the various budget schedules, we were most insistent that every phase of both the operating and cash budgets be prepared along lines exactly comparable with the accounting records. There were two main reasons for this paralleling of the accounts with the budget, first to facilitate comparison of actual results with the budgets and second, to make installation of budgets as simple and as painless as possible. Each operating unit or department was more or less familiar with the accounting records as applied to his own division of the business. It was therefore much simpler to install the budgets on a firm foundation by the simple practice of setting up the results anticipated in terms of future accounts.

In proceeding to install a budget plan there are two ways of approach, one by establishing a large budget organization and proceeding to install a plan in practically the desired final form in one attempt. The other, a slower method of developing a procedure to the finally desired basis by gradual stages. We chose the latter course as the one likely to produce the best final results. Budgets are effective only to the extent that they are properly prepared and used, and it is only by securing the wholehearted and enthusiastic cooperation of every key person in an organization that budgets can be prepared to reflect the future operating program of a company on anything like an accurate basis and on a basis which will serve a useful purpose.

The American Cyanamid Co. was faced with complete revision of accounting systems and operating policies in many of the units acquired. Methods of accounting fully adequate for a unit under the direction of an executive in constant and complete touch with business became obsolete and had to be revised. No matter how efficient an accounting and/or record system may be in the operation of a unit as a separate institution, it is extremely important that each unit in a large organization keep accounts and records on a definitely uniform basis and use standardized forms. Also, the need to expend substantial sums to permit realization of the purpose of acquiring each unit necessitated careful planning and allotment of funds to insure outlays being made in the most permanently profitable places.

Our first budgets for individual units had in many cases to be prepared with little or no help from records of past performance. Where records were available they were not on a basis which could be used to appreciable advantage. Persons responsible for a department or division were naturally a bit timid when they found it necessary to put their program on paper with the prospect of their estimates being compared with actual results.

Principles On Which Budget Was Based

In starting our task we adopted some principles which may seem a bit old fashioned, but to us they seemed to be common sense ones. The Budget Committee assumed that the executive responsible for each part of the company's activities was thoroughly competent and knew how to operate his part of the business successfully. We did not propose to set up a program which would in any way hamper an executive's work or discourage his initiative. We did not intend to set up a procedure which might be considered a spy system on an executive in the carrying out of his responsibilities. What we proposed was that the Budget Committee and the Budget Department act in a coordinating and advisory capacity. These functions are essential to successfully carrying out and balancing the company's broader, more complicated operating and financial program. The budgets prepared on standard forms and in standard manner were to be the compass for guidance of the Budget Committee and the Budget Department in operating in this coordinating and advisory manner. There was no question of the authority of the Budget Committee when it became necessary to make decisions within their jurisdiction based on facts apparent from the budgets. The purpose of the Committee might be stated as an intention to assist each responsible executive to render the greatest possible and best balanced service to the company's customers, employees, and stockholders.

After gathering records of past performance as nearly comparative to the accounting procedure in use as possible, we in the Budget Department sat down with each executive and department head and, with his intimate knowledge of activities for which he was responsible, the first set of estimates was prepared.

Great care was used not to get the first set of estimates so in detail as to be confusing or to appear to be a hopeless and endless task. Often we made no attempt to build up the full and ultimately desired details to support the summary estimate. Round figure totals for sales, cost of sales and expense estimates were used to get the budget sold on a gradual basis. Such figures were considered on the basis on which they were prepared merely as a guide or quota to shoot at. Comparisons were made on a similar guiding basis. The desire to have more detailed and more scientific budgets came direct from the man responsible for the activity. Each succeeding budget was more carefully prepared and in greater detail. When we arrived at the third or fourth budget our original goal was reached and always with the full cooperation and enthusiasm of the man on the job.

Each budget was recognized as the product of and the program for the man charged with the operation. Whether estimates were prepared with or without the help of the Budget Department they were carefully reviewed by the Budget Department, and if they were out of line, our ideas and reasons therefore were conveyed to the preparer. After arriving at an acceptable program, approval by the top executive of the unit was secured and the estimates were put into schedule form by the Budget Department preparatory to presentation to the Budget Committee for consideration and approval.

Mr. Bechtel's next article sets forth in detail how the budget may be set up.

Industry's Bookshelf

Handbook of Chemistry, by Norbert Adolph Lange; 1265 pages, and in addition, several supplements; Handbook Publishers, Inc.; $6.00.

Designed to be a practical day-in-and-day-out aid to the chemist in the laboratory. For the reason that the book was designed to be used at the laboratory desk, rather than as a reference work in a library, its size has been kept within reason and the author's delicate "job" of not only deciding what should go in but what could safely be left out, has been done with admirable care and good judgment.

An Introduction to Chemistry, by Frank B. Kenrick; 434 pages; University of Toronto Press; $3.00.

An elementary textbook constructed along rather revolutionary lines when comparison is made with the usual introductory textbook; author successfully interprets in laboratory terms a number of the commoner chemical words such as constituent, solution, element, chemical formula, ion, etc.; the whole idea making for a more interesting course for the student.

Physical Chemistry, by A. J. Mee; 779 pages; William Heinemann, Ltd.; 15s.

Can be highly recommended as a textbook on the subject. Certainly there is no surplus of satisfactory texts on the subject of physical chemistry and this addition to the list is more than likely to receive a warm welcome from the teaching staffs and others engaged in this phase of the research field.

Refrigerating Data Book, 2nd Edition, David L. Fiske, editor; American Society of Refrigerating Engineers; $3.50.

Although but a few years old this book is considered the authority in the refrigerating industry and no detailed review is necessary. The statement that a 2nd edition has been compiled would appear to be all that need be announced for anyone in the industry to immediately procure a copy.

Modern Brewing, by Carl A. Nowak; 318 pages; published by the author; $10.00.

One of the leading Metropolitan brewers' slogan is "Our Hand Has Never Lost Its Skill." Nevertheless, the art and science of brewing has changed and the methods and equipment even more so. Now that brewing is back in responsible hands, the appearance of an authoritative textbook after a lapse of nearly 20 years is an event.

The Fundamentals of Chemical Thermodynamics, by J. A. V. Butler; 207 pages; The Macmillan Co.; $2.00.

A comparatively short introductory textbook on the subject of thermodynamical method in chemistry.

Experimental Physical Chemistry, by Farrington Daniels, J. Howard Mathews, and John Warren Williams; McGraw-Hill; $3.50.

Advances in the last 5 years prompted the authors to undertake a complete revision of this popular physical chemistry textbook.

America's Capacity to Consume, by M. Leven, H. G. Moulton, and Clark Warburton. 272 p. Brookings Institution. $3.00.

An extremely valuable contribution to the problem of the distribution of wealth in the United States. Carefully documented and graphically illustrated by an elaborate series of extremely clear charts (many of them in colors), the income of the American people is set forth in a way that should do a great deal to clear much of the miscomprehension in future debate on this vital subject.

Codes, Cartels, and National Planning, by Bruno Burn. 413 p. McGraw-Hill Book Company. $4.00.

A German professor, well informed and sympathetic to the cartel movement, sets forth in detail how the NRA codes might be employed to insure economic stability.

Capital and Interest, by Montgomery D. Anderson. 212 p. Business Publications, Chicago, Ill. $2.50.

A business-like presentation of the economic concept of interest, with a mathematical demonstration of the importance of time as a dimension of wealth—stiff reading but stimulating in its ideas.

Zinc Cure for Florida Crop Ills

Discovery that zinc is important in correcting bronzing of tung oil trees, frenching or mottle-leaf of citrus, rosette of pecan and white bud of corn has been announced by the Florida Experiment Station.

The response of trees to zinc treatment was amazing, so much so, in fact, that workers have spent added time checking and rechecking results. The difference between zinc and no-zinc crops is often the difference between a sickly yellow citrus foliage and foliage of a dark green color.

Results have been so convincing on certain soils that growers in the State are already applying large amounts of zinc on the basis of very preliminary results obtained as the experiment progressed. So far zinc is the only rare fertilizer element which has appeared to be worth while.

Extensive tests are now being conducted on citrus, tung oil, velvet beans, pecans, peanuts, corn and a number of other crops. In some cases it is applied to the soil, in others sprayed on the trees. Both methods have given good results but with citrus the spraying has proved more practical and better. Zinc will prove helpful only where the soil contains too little for plant needs and too much may be toxic. *From the Fertilizer Review.*

Aluminum in Chemical Plants

New uses of aluminum in apparatus and containers, as reviewed at the recent meeting of the American Institute of Chemical Engineers, by the Director of Research of The Aluminum Company of America.

By Dr. Francis C. Frary

THE chemical industry is notoriously severe in its demands on materials of construction, because of the corrosive character of many of its raw materials and products, and the injurious effects on the latter of impurities introduced by corrosion. It has often been said that the greatest problem in connection with a new chemical process is usually the apparatus in which it is to be carried out, and the most troublesome limitations in the design of this apparatus are often the properties of the materials which may be allowed to come into contact with the chemicals used.

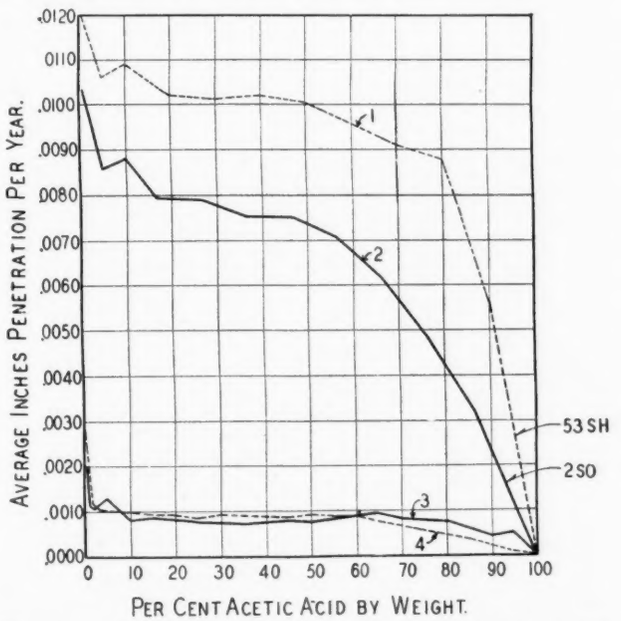


Figure 1. Corrosion of aluminum by acetic acid at room temperatures and at 50° C. Curves 1 and 2 drawn from immersion at 50° C. for 48 hours. Curves 3 and 4 drawn from immersion at room temperature for 60 days.

Like the other metals, aluminum has certain advantages and certain drawbacks, from the standpoint of the chemical industry, and their consideration will often determine the desirability of its use. If such use is found desirable, we come naturally to the problems of design and fabrication, which will be taken up in the latter part of this paper. The principal advantages of aluminum center around its resistance to corrosion by certain chemicals, and the character of the corrosion products formed. While the metal *per se* is very active chemically, it is always (except when amalgamated) covered with a thin, adherent, naturally-formed coating of its oxide. This is very inert chemically and quite insoluble in some reagents; particularly most organic liquids, distilled water and many organic acids. For certain purposes, it is advantageous to produce a thicker oxide coat by anodic treatment in suitable solutions[1] and improve the impermeability of the oxide coating by "sealing" treatments, or impregnate the coating with corrosion-inhibiting substances. In other cases as, for example, where brine is the corroding agent, special alloys are found to be much more resistant[2] than pure aluminum, and sometimes it is possible to add corrosion inhibitors, such as a dichromate,[3] to the brine without interfering with the process. In most cases, however, the corrosion resistance of aluminum in acid or neutral solutions increases rapidly as the purity of the metal increases, Broadly speaking, magnesium, manganese, chromium, and possibly antimony are the only alloying elements commonly added to aluminum which do not reduce its corrosion resistance to most chemicals.

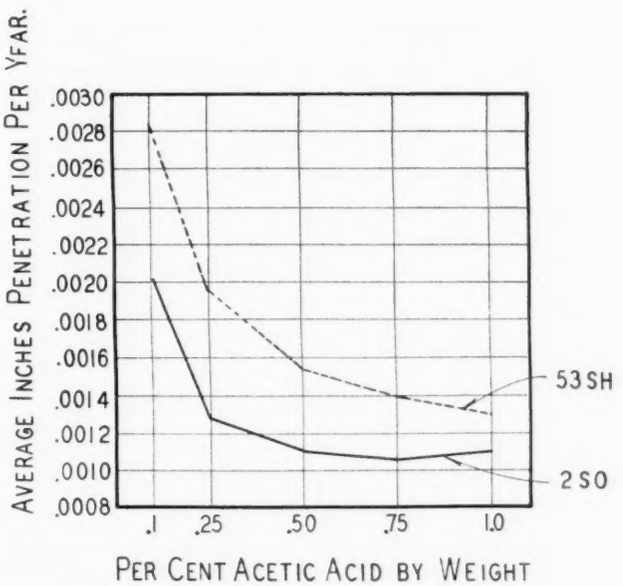


Figure 2. Corrosion of aluminum by very dilute acetic acid. Curves represent results of 60 days' immersion at room temperature.

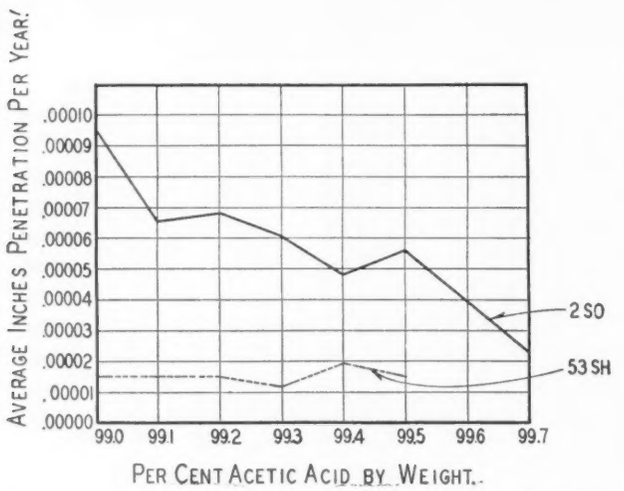


Figure 3. Corrosion of aluminum by strong acetic acid. Curves represent results of 60 days' immersion at room temperature.

One of the important advantages of aluminum lies in the fact that its salts are colorless, and slight corrosion, therefore, does not discolor or stain the materials with which it is in contact, or others with which such materials may later be used. For this reason, aluminum stills, tanks, tank cars, and drums are standard equipment in the synthetic acetic acid industry, and aluminum equipment is becoming increasingly important in the cellulose acetate industry and the organic solvent industry. Figures 1, 2 and 3 give the results of laboratory tests, and show graphically the very slow rate of attack of aluminum at room temperature by acetic acid at all concentrations except the most dilute. However, at the other end of the curve, the rate of attack rises rapidly if even small amounts of acetic anhydride are present. Higher temperatures also increase the rate of attack by the dilute acid. Freedom from discoloration effects is also an important reason for the use of aluminum in the naval stores industry and in varnish making. The stearic acid industry is interested in the same property and also in the fact that a cake of stearic acid solidified in a properly designed aluminum pan does not adhere to it.

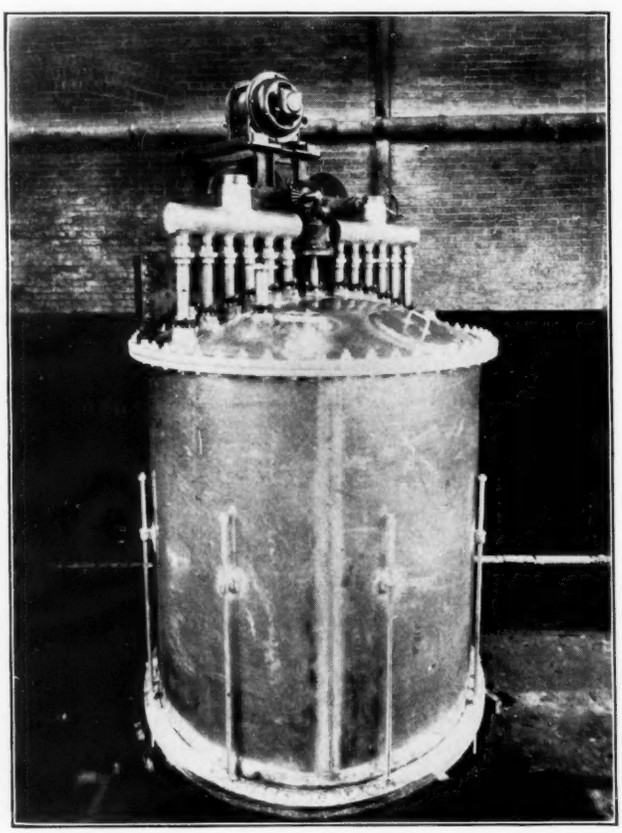
The fact that the corrosion products, in the amounts formed, are completely non-toxic, not only to man and animals[4] but also to the yeasts and moulds used in the fermentation industry, is of great importance, as in the dairy industry, the production of citric acid from sucrose, and that of gluconic acid from glucose. Also, aluminum seems to have no specific destructive effect on vitamins, even at elevated temperatures.[5]

Moreover, as it only forms one series of salts, aluminum causes no catalytic oxidation effects, such as may occur in air in the presence of iron or copper salts. Such catalytic oxidation, in the presence of traces of certain metals, has been shown to be the cause of the development of "off" flavors in dairy products[6] and may perhaps produce a similar effect in other foods. The fact that aluminum is the only common metal which, in its commercial form, does not appreciably catalyze the decomposition of hydrogen peroxide, accounts for its increasing use in the manufacture and shipment of this chemical. Its inertness toward sulphur, hydrogen sulfide and organic sulfides is also often useful, as, for example, in pipes for handling molten sulphur from the wells and cars for shipment of lump sulphur, and in the distillation and handling of the so-called "sour" crude oils, which are high in sulphur.

Extensive tests have shown that aluminum is inert toward anhydrous sulphur dioxide and ammonia (liquid or gas), and the Underwriters' Laboratories have therefore approved its use in refrigeration units employing these materials. Its good thermal conductivity is of importance in the fins, trays, etc., of the refrigerators, and its high reflectivity and low emissivity have made aluminum foil important as a light-weight, non-combustible and vermin-proof heat insulator for both refrigerated and steam-heated equipment. The high thermal conductivity is also valuable in equipment when uniform heat distribution and avoidance of local overheating are important.

Satisfactory foreign experience in shipping synthetic nitric acid in aluminum containers has led to their approval in this country also, for acid of 80% concentration or better. The slow rate of attack by this strong acid is shown in Figure 4. Small amounts of hydrochloric acid or sulphuric acid greatly increase the attack, but larger amounts of sulphuric acid reduce it, as will be seen from the curves.

General inertness to acid fumes, high moisture proofing power and long life under the influence of sunlight,



Aluminum alloy plate rosin agitator with a capacity of 1,280 gallons.

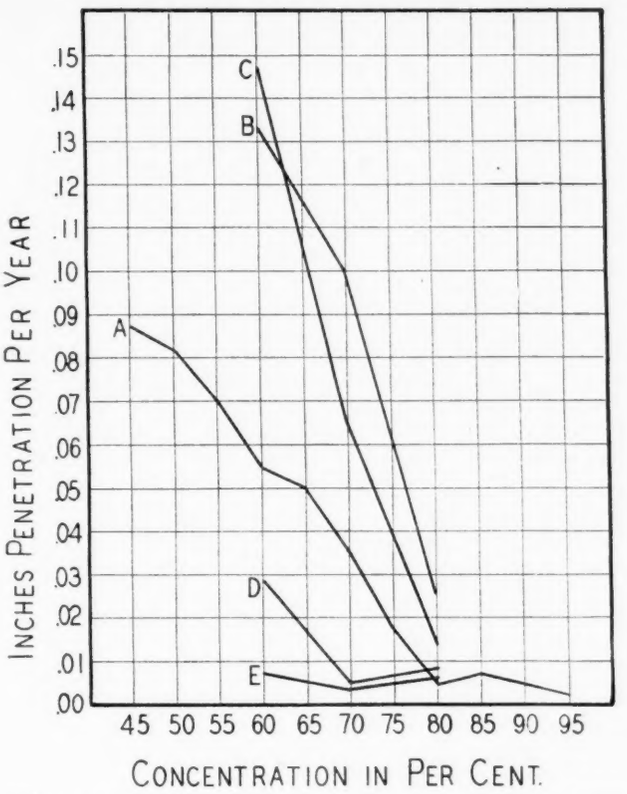


Figure 4. Action of nitric acid-sulfuric acid mixture on 2SH aluminum. Duration of experiment and acid:

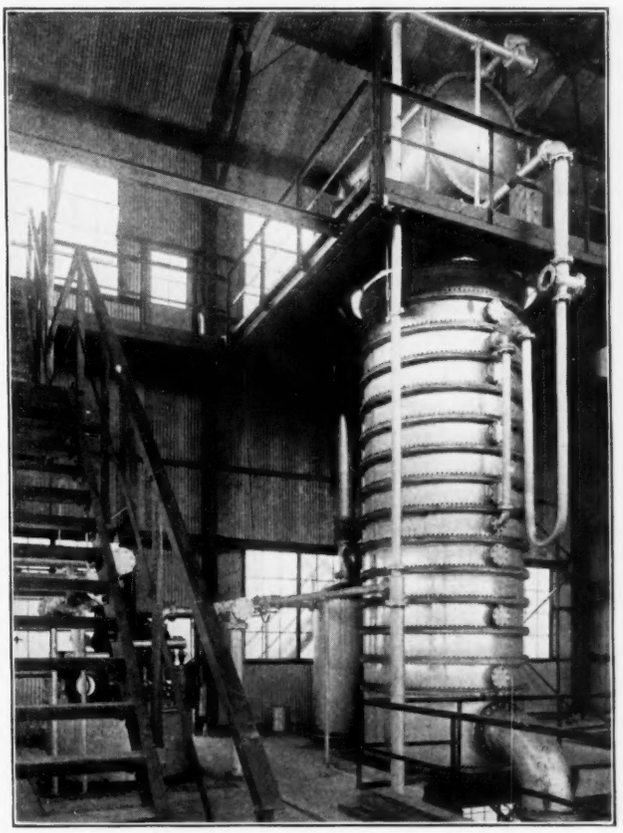
a. 90 days, 45%-95% HNO_3 only.
b. 30 days, 60%-80% HNO_3 + 0.5% H_2SO_4
c. 30 days, 60%-80% HNO_3 + 1% H_2SO_4
d. 30 days, 60%-80% HNO_3 + 5% H_2SO_4
e. 30 days, 60%-80% HNO_3 + 10% H_2SO_4

have made aluminum paint very popular in many chemical plants, for the protection of both wood and metal, and to improve the lighting conditions. Even dilute chlorine fumes, as in a cell room, seem not to seriously injure it, but it will not stand a spray of caustic solutions.

In some cases, as in bobbins and spinners for the rayon industry, the combination of light weight with adequate strength and resistance to shock (which causes breaking or chipping in stoneware, etc.) is of considerable importance in addition to the chemical resistance of the metal. The fact that the metal can be cast or wrought in almost all forms, and can be welded as well as bolted or screwed together, is often an additional advantage in building equipment. A good example of the value of strength and stiffness, combined with chemical resistance, is found in the substitution of aluminum for block tin in the storage and handling of distilled water.[7]

Another interesting physical property was revealed in the mechanical tests of aluminum drums for shipping nitric acid, hydrogen peroxide, etc., where dropping full drums from a considerable height failed to burst them, even when they landed on a rail or I-beam. The low modulus of elasticity and the high ductility of the grade of aluminum employed enabled the drum to absorb the shock and stress of the impact by extensive general deformation, rather than by local failure, such as would have occurred in a steel drum. The same property has appeared to advantage when aluminum tank cars or tank trucks have been involved in wrecks, avoiding spillage of their valuable and sometimes dangerous liquid contents. Standard designs for aluminum drums and tank cars have now been worked out by the Manufacturing Chemists' Association and the Tank Car Committee of the American Railway Association, and approved by the Interstate Commerce Commission.

Turning to the other side of the picture, we face the fact that aluminum and its alloys are all rapidly attacked by fixed caustic alkalies (NaOH, KOH, $Ca(OH)_2$, etc.) and by the halogens and halogen acids. This attack is to be ascribed to the solution or removal of the natural protective oxide film, and increases in vigor with increase in temperature and pH. Alkali carbonates likewise attack aluminum, but more slowly, and the same holds true for other soluble alkali metal salts which hydrolyse so as to produce an alkaline reaction (e.g., trisodium phosphate). Fortunately, however, the action of these salts, mildly alkaline soaps, and the like may be inhibited by the addition of a very small amount of certain grades of sodium silicate. The G. C. grade of the Philadelphia Quartz Company is of the type which seems to give the best results. Silicates do not, however, satisfactorily inhibit caustic alkali solutions. Ammonia solutions, if free from heavy metals and chlorides, form a thick, impervious coating of aluminum oxide in the course of a few days, and then have no further effect, so aluminum has been very successfully used in condensers for ammonia-water mixtures.



Fractionating tower made of aluminum.

While aluminum cannot be used with free halogens or halogen acids, or moist organic halides capable of hydrolysis in the presence of water, the corrosive effect of aqueous solutions of the chlorides of the alkalies and alkaline earths can be prevented by the addition of the proper amount of a salt of chromic acid ($K_2Cr_2O_7$ or $Na_2Cr_2O_7$, equal to 1% of the chlorine content) and such additions to refrigerating brines, to calcium chloride used for spraying coal carried in aluminum trucks, etc., have been very successful. No satisfactory inhibitors are known for the free halogen acids, and their presence generally must be avoided. In the case of organic halogen compounds which hydrolyse slightly, however (e.g., CCl_4), experience shows that anodic oxidation of the aluminum will give adequate protection, so long as copper, brass or similar metals are not present.

The injurious effects of salts of heavy metals, such as copper, tin, or lead, must always be considered, and materials contaminated with them are often unsatisfactory for contact with aluminum, if even a little water is present. The deposition of a minute speck of the heavy metal, by reaction of its salt with aluminum, sets up a short circuited battery with the aluminum as anode; this results in deposition of more heavy metal and hydrogen, and a rapid corrosion of the aluminum immediately adjacent to the heavy metal particle, with the formation of a sharp pit which may deepen rapidly and eventually cause perforation. It has been our experience that spectroscopic examination of the corrosion product in the bottom of most of the local pits, which occur unexpectedly in aluminum apparatus, shows appreciable amounts of one or all of these metals. Previous contact with copper, brass or tin equipment caused the metals to be taken up by the solutions being treated, and the aluminum removed them and was corroded because of their presence.

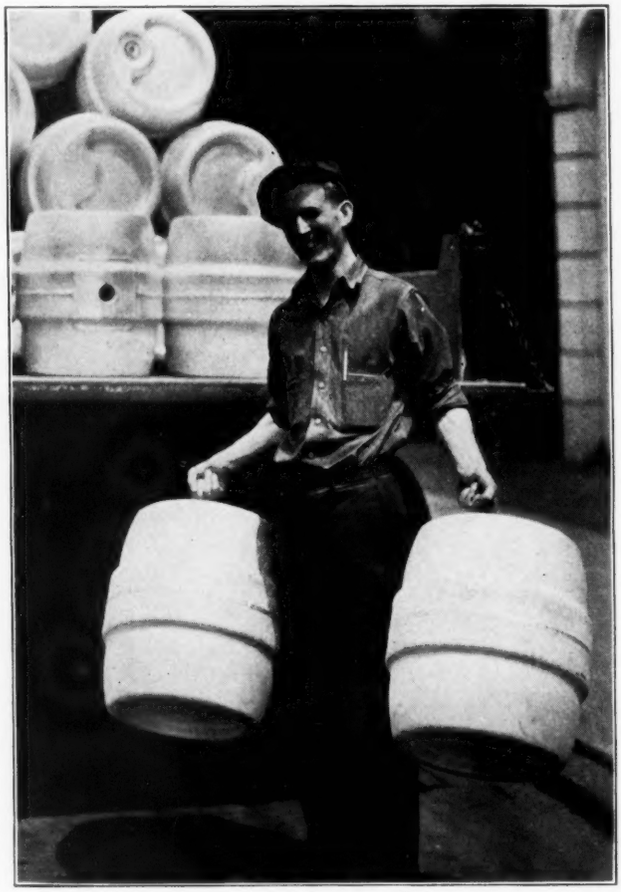
Certain organic compounds, if present, may be affected by the aluminum. Thus, certain fruit colors are reduced and decolorized by long standing in contact with aluminum, in the absence of air. Sometimes the color returns upon exposure to air. Although pure aqueous alcohol is not affected by aluminum, whiskey that has been aged in wood cannot be stored for a long time in aluminum without danger of developing turbidity, because of precipitation of some of the dissolved organic matter. Red wines may be partly bleached, but, on the other hand, beer is not affected at all so long as pure aluminum or the alloy 53S (containing magnesium and silicon as alloying additions) is used. Aluminum containing much iron, copper or manganese may affect beer.

Because of its low melting point (about 660° or 1220° F.), the strength of aluminum decreases as its temperature is raised.[8] This must always be considered and allowed for in the design of chemical equipment. The lower modulus of elasticity, which causes the aluminum to yield elastically or bend more than steel at a given unit stress, must also be considered in the design. Generally a slight increase in wall thickness is enough to compensate for this, as the stiffness of a metal sheet increases as the cube of its thickness.

Tables and other information are available in the literature and in the manufacturers' trade publications,[9] showing compositions and properties of the pure metal and a great variety of alloys. These need not be repeated here. In attempting to use them, however, certain general principles must be observed and these will be discussed.

Aluminum articles may be broadly divided into two groups—wrought and cast. In general, an alloy suitable for wrought objects is not used for castings, and vice versa. Pure aluminum is practically always used in a wrought form, as it is difficult to cast it into any but the very simplest shapes (ingots). Because of the crystallization shrinkage, it is difficult to produce any large castings of moderate to thin wall thickness which will be completely non-porous and impermeable to liquids and gases under pressure. For this reason, equipment for treating liquids or gases under pressure should generally be designed to be made of wrought metal wherever possible. Small simple castings like pipe fittings, however, can be made tight with the proper technique and the use of certain alloys, and are regularly made and used for such work. Castings may also be used for apparatus where there is no pressure difference to be withstood, as for bubble caps in an oil still, etc.

The ease with which aluminum may be given special



Aluminum half-barrels are so light they may easily be carried on the finger of one hand, and weigh only eighteen and one-half pounds each.

shapes by drawing, hammering, forging or extrusion makes it practicable to produce almost any piece of equipment in the wrought metal. Most such equipment for the chemical industry is made of either commercially pure aluminum (2S) or an alloy containing about 1.25 per cent. manganese (3S), or one containing 1.25 per cent. magnesium and 0.7 per cent. silicon (53S), because these are the most resistant, in general, to corrosion. For salt solutions, however, a new alloy (52S) containing a small amount of magnesium has shown a greater resistance than even pure aluminum, and with a casting alloy of a related composition (214) will probably give the best results obtainable with aluminum alloys. Pure aluminum is the weakest and 53S is the strongest of the alloys just mentioned. The latter alloy is strong enough so that commercial beer barrels made of it withstand a pressure of 500 pounds per square inch.

Another factor to be considered in the design is the effect of the conditions of use upon the initial strength of the material, as determined by its "temper." Like other metals, aluminum is hardened and strengthened by cold work (rolling, hammering, swagging, etc.), and may be obtained not only in the annealed (O), but also in the quarter hard (¼H), half, three-quarters and full hard (H) tempers. The hardening effect may be removed by annealing, which takes place quite rapidly at 300° C. and more slowly at lower temperatures down to about 150° C. Unless the amount of cold working has been abnormally large, no annealing takes place at 100° C., even after several years. If the equipment is to be used at somewhat higher temperatures, a higher eventual strength may be obtained by starting out with "half hard" rather than "full hard" material, as the greater internal stress in the more highly worked "full hard" material lowers the annealing or softening temperature,[10] so that after some time at, say 200° C., the "half hard" sheet remains stronger than the "full hard" material. The alloy 53S may be considerably strengthened by heat treatment (quenching from about 500-510° C.) and is then further hardened by heating ("aging") at temperatures of 100-150° C., but may be softened again at somewhat higher temperatures.

As to low temperatures, aluminum is in the very fortunate position of increasing in both strength and ductility as the temperature drops, and does not show any tendency to develop brittleness at low temperatures, as far as we know. There are no allotropic or other changes which are brought about in it by low temperature.

The accompanying illustrations show some of the different types of chemical engineering equipment that have been built of aluminum. Because of the many variable factors influencing the life of aluminum and its behavior in any chemical process, consultation with experienced manufacturers of aluminum equipment is desirable before the design is determined. The adaptability of the metal or alloy for the proposed use should be determined in advance, if possible, by submitting a suitable piece of the metal to the exact environment in which it is proposed to employ it. On the basis of such information, a reliable decision may be made as to the use of the metal and the design of suitable equipment.

The data on which the curves are based, and much other specific information in this paper are the result of work carried out in the Aluminum Research Laboratories under the direction of Messrs. H. V. Churchill and J. R. Akers.

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3. About 1% of the Cl content of the NaCl, $MgCl_2$ and/ or $CaCl_2$.
4. Mellon Institute of Industrial Research, Bibliographic Series Bulletin No. 3.
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Tin Weighted Silk

The Chemical Trade Journal reports that G. Colombo (in *La Générale des Matières Colorantes*, August, '34), states that thiourea is used in silk-dyeing establishments of France and Italy, for the preservation, by after-treatment, of silk loaded with tin salts. The thiourea process was first proposed in 1905 by Dr. Paul Sisley, but due to the high cost of adequately pure thiourea did not, for some years, receive industrial application. The manufacture of thiourea by a process of Dr. Sisley's was later commenced by the Teinturerie Vuillod Ancel et Cie., and the plant was adequate to meet the whole of the needs of the European silk trade in thiourea, and at a price of about 7 lire per kilog. Colombo states that although with the elaboration of new processes for the manufacture of thiourea from cyanamide, material from other sources came on the market, it was not found possible to produce a commercial material of a degree of purity higher than that of the original manufacture by the Sisley process.

Silk loaded with tin salts, if unprotected, rapidly disaggregates under the influence of light. The mechanism of this change was first studied, in 1896-1897, in the Laboratorio di Esperience sulla Seta, working in co-operation with the S.-A. Co-operativa per la Stagionatura e L'Assaggio delle Sete ed Affini, under the leadership of Professor G. Gianoli. It was established that the alteration in the silk was largely due to the presence of traces of stannous salts or iron salts. Later work threw doubt on the effect of the stannous salts, but confirmed the important rôle of the iron salts in the photochemical reactions which lead to the destruction of the tin-weighted silk. Early in 1904, Colombo, in conjunction with Professor Gianoli, discovered the protective effect of 3% ammonium sulfocyanide on silk loaded with tin silico-phosphate. These results were later confirmed on the works scale, but the material was later superseded by thiourea when, the next year, Dr. Sisley proposed its use. Other substances that have been proposed for the purpose are hydroxylamine and the salts of sulfonated hydroquinone, but the use of these latter materials has been limited to special cases. The special merits of thiourea are that its speed of decomposition is very low; neither it nor its decomposition products adversely affect the properties of the silk or the shade and fastness of the dyes used; it does not give rise to spots on contact with metal; and it has never been found responsible even for mild attacks of dermatitis.

Rare Gases

By Dr. Floyd J. Metzger

Vice President, Air Reduction Company

Nitrogen is not the only gas in the air which chemical industries have made industrial raw materials. In this paper, delivered upon the occasion of the award of the Chemical Industry Medal to Dr. Metzger, he tells graphically the story of their technical development and commercial use.

DR. W. F. HILLEBRAND once replied when asked what he meant by a "trace", "It is that quantity which passes into the deep recesses of remote decimals." There are problems of chemical research and development involving the production in large quantity of products or substances whose raw materials contain only such "traces" of the product sought.

I have in mind such an outstanding achievement, as the extraction of radium from radium-containing materials. The pitchblende with which Mme. Curie worked contained less than one part per million of radium, and she obtained only a fraction of a gram of radium per ton of ore treated. Another example is of quite recent accomplishment, the extraction of bromine from sea water. Industry demanded such large quantities of bromine that the only logical raw material was sea water which contains sixty-seven parts per million. They have been able to corral these "parts per million" into tons per day.

In work of this kind there appear to be two essential, if not imperative, requirements. First, the operation must be continuous in order that the processing of sufficient raw material may be accomplished. Second, research and development must be carried out on a comparatively large semi-works scale to obtain sufficiently accurate data which may later be translated into terms of full plant operation. Indeed in some cases, unless research operations are carried out on a semi-plant or even full-plant scale, results may be entirely negative.

I should like to refer briefly to some developments of our own in recovering traces, particularly in the field of the rare gases of the atmosphere, and to make some mention of the way in which such a problem is approached.

The following table gives the boiling points and quantities of the elements in the atmosphere. The quantities for the major constituents are quite accurate. The figures given for the minor constituents, however, must be taken as approximations only. It will be noted that the element hydrogen is questioned; this will be referred to later.

THE ATMOSPHERE

COMPOSITION

	Boiling Point C°	*By Volume*	*By Weight*
Nitrogen	—195.814	78.03%	
Oxygen	—182.963	20.99	
Argon	—185.84	0.94	
Hydrogen	—252.54	1 part in 10,000 (?)	
Neon	—246.3	1 part in 65,000	1 lb. in 44 tons
Helium	—268.98	1 part in 200,000	1 lb. in 725 tons
Krypton	—152.9	1 part in 1,000,000	1 lb. in 173 tons
Xenon	—107.1	1 part in 11,000,000	1 lb. in 1,208 tons

Oxygen and nitrogen were the first of these constituents to be sought, as such, for industrial uses, and large scale requirements for these products came about a third of a century ago. In the earlier stages, the processes employed for supplying the oxygen demand were of various kinds, some based on purely chemical methods, others on the electrolysis of water. At the present time the chemical methods have passed entirely out of the picture, and there are left two general processes, electrolytic and liquefaction, the latter process supplying nearly all the industrial oxygen. These liquefaction processes for the production of oxygen have been developed to a high degree of perfection and today the recognized standard of purity of the commercial gas in cylinders is 99.5 per cent., the balance being argon with a little nitrogen.

The demand for nitrogen came for use in connection with the various processes of nitrogen fixation, which have now been firmly established. Nitrogen can readily be produced from the air by liquefaction and rectification at a purity of 99.8 per cent. to 99.9 per cent.

About fifteen to twenty years ago inquiry began to be made for some of the rare atmospheric gases for use in industry, the requests coming largely from those engaged in the manufacture of electric lights, and research and development work for the production of these rare gases was undertaken. Cavendish in 1785 was the first to suspect that the atmosphere contained gases other than phlogisticated air (nitrogen) and dephlogisticated air (oxygen). His published statement, "If there is any part of the phlogisticated air of our atmosphere which differs from the rest and cannot be reduced to nitrous acid, we may safely conclude that it is not more than 1/120th part of the whole" was a remarkably close estimate. Cavendish actually isolated a mixture of these rare gases. However, one hundred

years or more elapsed before Cavendish's observation was clarified, and it remained for Sir William Ramsay, Lord Rayleigh, Travers, and others (1894-1898) to separate and identify the five rare gases.

Much laboratory and scientific investigation of their properties followed. However, a further period of nearly twenty years elapsed before an appreciable application of them was discovered and a demand created for the production of one of them, namely, argon. At the time, no method had been perfected for its production on a scale commensurate with the probable uses.

The boiling point of argon falls between nitrogen and oxygen, being approximately 10 degrees above the boiling point of nitrogen and less than 3 degrees below that of oxygen. Therefore, argon may be diverted from an intermediate point in the rectifier, where the oxygen vapor is richest in argon content (5 to 7 per cent.) and contains but little nitrogen. This diverted vapor is further rectified in a separate column, but within the cycle as a whole, to a product containing about 65 per cent. argon, which is continuously withdrawn from the system as raw argon gas; the impurity is essentially oxygen with a small quantity of nitrogen. Further purification of raw argon is accomplished by chemical means. The oxygen impurity is removed first by burning with an exact proportion of hydrogen, and the nitrogen may be taken out, if desired, by combining with alkali metals or metallic calcium at elevated temperatures.

Extraction Neon from the Air

For the extraction of neon from the air, and simultaneously therewith the helium, we have to look to the coldest part of the equipment: namely, the uppermost end. Both of these elements have boiling points which are extremely low and cannot be liquefied except under extraordinary conditions. It is obvious therefore that these will remain in the gaseous state throughout any air liquefaction system. By means of devices located in the coldest or uppermost part of the system, these gases may be continuously withdrawn as a neon-helium mixture. The raw gases will contain approximately 40 to 50 per cent. neon with 12 to 15 per cent. helium, the balance being nitrogen. Further separation of this neon-helium mixture to produce each in a pure state is accomplished by a systematic absorption and revaporization from activated charcoal traps employing liquid air or liquid nitrogen for cooling. Metallic calcium or alkali metals may also be used for the removal of minute traces of impurities if present, as in the case of argon.

The recovery of krypton and xenon from the atmosphere is perhaps an extreme example of the type of manufacturing problem which we have been discussing. Dr. Hillebrand's "traces" is surely the term which may be applied to the quantity of krypton and xenon in the air.

Even with 100 per cent. recovery, it becomes necessary to process 173 tons of air for the recovery of one pound of krypton and 1,208 tons for one pound of xenon. The boiling point of each of these elements lies considerably above that of any of the other atmospheric constituents. They will therefore tend to accumulate at the warm end of a liquefaction system, or, in other words, they will be looked for in the liquid oxygen fraction. By continually drawing off the liquid oxygen component and subjecting it to further rectification, we are able to segregate the krypton and xenon into a relatively small proportion of the total oxygen liquid produced.

Separation of Krypton and Xenon

This is withdrawn from the system as liquid and allowed to vaporize to a raw gas containing approximately 5 per cent. krypton and xenon, the balance being essentially oxygen. This raw gas is then subjected to further purification by selective absorption in activated carbon at low temperatures, the final result being the separation of krypton and xenon, each in pure form.

During the early period of our operation of the krypton and xenon plant, we were puzzled by the fact that we were getting considerably more than 100 per cent. yields of these gases. Some time later this matter was cleared up by new and more accurate determinations which showed that the amount of krypton and xenon in the air was appreciably more than had been originally estimated. On the basis of this newer data, the performance of our present krypton-xenon equipment is such that we actually get a recovery of approximately 75 per cent. of the air content of these gases. Our large scale operations, at least in this case, were more nearly quantitative than previous determinations carried out on a comparatively small scale.

Applying all methods known for separation and purification, we semed to be unable to produce 100 per cent. pure krypton and actually marketed this gas for a considerable period with the statement that it contained approximately 1½ per cent. xenon. However, after much time spent on this problem, the matter was cleared up by the publication of some newer and more accurate data which confirmed our own results and showed that previous data as to the density of krypton was in error; furthermore, that the gas which we had been marketing as 98.5 per cent. was, from the beginning, 100 per cent. pure.

It might be said that the spectroscope should have revealed any impurity in these gases. This however is not the case. It is very difficult in some combinations of these gases to detect impurities readily even when they exist to a considerable extent. For example, one part of krypton in one million of oxygen can readily be detected by ocular examination, through a spectroscope, of the gas under electrical discharge. However, 1 per cent. of oxygen in krypton cannot be so detected. Again, one part of krypton in 3,000,000 helium can readily be detected when viewed through a spectroscope, whereas about one part helium in two parts argon is the limit of detection in this way.

There is still another interesting fact which arose in connection with our large-scale work on krypton and xenon; namely, that we have invariably found methane in the raw gas mixture containing krypton and xenon. We are not prepared to state conclusively at this time whether this methane has its origin as a normal constituent of the atmosphere or whether in some way it may arise by decomposition of the lubricant used in the air compressor. We hope at some later date to get definite information as to the origin of this gas.

It might be well to call attention to hydrogen which is questioned in the above table. Hydrogen, on account of its extremely low boiling point, should and would be found in the raw gas obtained from our plants producing neon and helium. It is only on rare occasions that we are able to detect the presence of hydrogen in these gases. Since we find it only occasionally, it is questionable whether it is a variable or constant constituent of the atmosphere. It can however be said that we have never observed its presence to the extent of more than about one part per million, instead of the very much higher figure generally assumed.

Extraction of Helium from Natural Gas

The extraction of the rare gas helium from natural gas is an activity which originated during the war in an endeavor to secure a non-inflammable gas for use in lighter-than-air craft. Since, in certain localities, large quantities of natural gas were available which contained from a fraction to about 1 per cent. of helium, these were the natural raw materials to be considered for the production of helium. These activities have been so frequently discussed that suffice it to say that millions of cubic feet of helium have been produced from these natural gases.

All of these gases until comparatively recently have had a value only as museum specimens except perhaps in a few instances where they were being applied in very specific cases. Their complete chemical inertness of course precludes any use in that direction. However, their physical and particularly their electrical properties are quite unique and characteristic. In this field useful application has been found.

Argon, to date, has found its greatest use in connection with incandescent filament lamps, replacing in whole or in part the nitrogen in the so-called gas filled lamps, just as nitrogen had replaced the vacuum lamps. By substituting argon for the nitrogen in these lamps, considerably greater efficiencies are obtained; tens of thousands of cubic feet per month are consumed for this purpose. There are other uses for argon, such as in the manufacture of rectifying tubes for delivering direct current from an alternating current source. It is also used admixed with other rare gases in the manufacture of many of the well known luminous tubes.

Neon is quite characteristic in its high electrical conductivity and light-emissive powers when an electrical current is discharged therethrough. For this reason it finds its greatest application in lights of the gas-discharge type now so familiar in display signs. Its characteristic orange color can be and is varied or even completely changed by suitable admixtures of other rare gases. The color characteristics exhibited by such tubes can also be varied by the kind and intensity of current employed. Most tubes of this kind are operated with high tension current (5,000 to 15,000 volts and 15 to 50 milliamps) and in lengths up to 50 or 60 feet. Considerable standardization has taken place recently in order to meet standard transformer construction. The current consumption in all of these rare gas display signs is quite low as compared with an equivalent design constructed with filament lamps.

Since luminous tubes of considerable length can be operated, the extent of the design that can be worked out is limited only by the skill and ingenuity of the glass-blower. Quite recently there have been developments which make it possible to operate these gas filled lamps on the ordinary 110 volt lighting circuit. This will no doubt lead to more general application particularly as there has been considerable progress made towards their use for actual illuminating purposes. Another type of rare gas lamp is the cathode glow lamp in which the luminosity is a glow discharge on the surface of the cathode. This type of lamp operates on the ordinary 110 volt lighting circuit.

Helium is used in the lighting field particularly for the production of yellow and "white" lights. It is also used as an admixture with other rare gases. There are many other applications of the rare gases, such as in the production of lightning arresters, high tension testers, and detectors and luminous tubes for stroboscopes. Krypton and xenon find uses in some of the above mentioned fields, it having been found that additions of very minute quantities of these gases will bring about a decided change in the electrical characteristics.

According to some very recent authoritative information, it would seem that the rarest of all the rare gases, krypton and xenon, may find a field of their own and replace argon, the most plentiful, just as argon has replaced the more abundant nitrogen.

G. Claude (Compt. Rend. Vol. 198 (1934) P. 1959) has recently announced his findings with respect to their usefulness as a substitute for argon in filament lamps. He finds that a 25 watt filament lamp containing krypton and xenon will operate at an efficiency one-third greater than the same lamp containing argon. The substitution of krypton and xenon for argon in these lamps would call for production of these rare gases on a scale hitherto unattempted. To produce the gases on such a scale would require the handling of some thousands of tons of air per day in a single operating unit. However, with the advance in the knowledge and skill that has taken place in air liquefaction processes over the past few years, it is entirely within the realm of reason to suppose that if a real demand is made for these extremely rare gases, technical skill will be able to meet it.

Safety in Unloading Tank Cars

Part II

By A. C. White

Technical Sales Division, Dow Chemical Co.

THE principal alkaline materials such as caustic soda and potash, soda ash, bicarbonate of soda, the modified sodas, ammonia and sodium silicate have nearly as widespread application in the manufacturing and chemical industries as the acids. They form, in the aggregate, a substantial percentage of tank car loadings.

Alkaline materials do not appreciably attack iron or steel equipment, and unless an "iron free" product such, for example, as caustic soda for the viscose industry is desired, they can safely be shipped in ordinary steel tank cars. By using nickel lined cars with nickel heater coils, alkaline materials may be carried without fear of iron contamination.

Comments on the unloading of caustic soda solutions will serve as examples of methods to be recommended as satisfactory.

Caustic Soda Solutions

Caustic soda is generally shipped as a water solution containing from 50 to 70 per cent. NaOH. Solutions of this strength deposit crystals of sodium monohydrate on cooling and in cold weather the entire tank contents may become a mushy solid. For unloading, it is essential that caustic liquors be thoroughly in solution, and for this reason all cars used for the transportation of this product should be equipped with steam coils.

After arrival the car should be carefully inspected by removing the dome cover and feeling the sides and bottom of the car with a long rod for the presence of crystalline deposits. If solids are found, the solution is heated by passing low pressure steam through the heating coils until the outside of the car feels warm to the hand at both ends. The temperature of this caustic liquor should be at least 75° F.

When the caustic is thoroughly heated, the exposed discharge fitting on the bottom of the car should be warmed by attaching a steam hose by a wrapping of burlap bags. (Blow torches or other flames should never be used). The bottom discharge connections are made as recommended above, the valves opened and the contents of the car are either pumped or allowed to drain to the proper storage tanks.

The same general instructions given above for caustic tank cars should be followed in unloading caustic potash and sodium silicate.

Strong alkalies produce disagreeable burns frequently difficult to heal and both leather and wool are rapidly attacked. Rubber gloves and boots should be provided for protection of workmen's hands and feet and tightly fitting glasses or goggles should be worn at all times when handling caustic or other strongly alkaline solutions. A 5 per cent. citric acid solution should be applied to caustic burns and a 1 per cent. solution available as an eye wash.

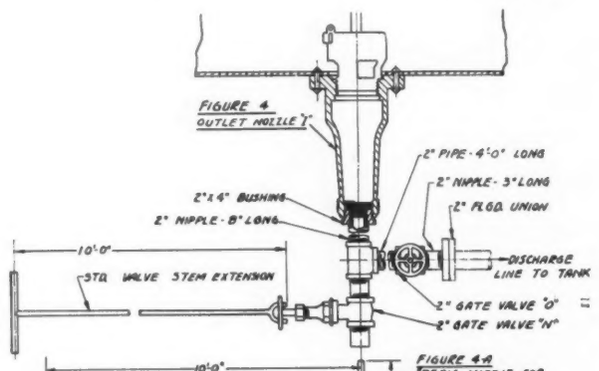
Liquid ammonia is shipped in high pressure heavy welded steel tank cars class I.C.C.-105-A-300, the last number of this indicating that the car has been tested to withstand a pressure of 300# per square inch. Tanks of this class are equipped with a vapor proof dome or manway, under the cover of which are located four unloading valves, a safety valve, a gauge pipe and a sampling line.

Cars containing liquid ammonia are always loaded under pressure and generally leave the manufacturer's plant with a pressure of approximately 70 to 80 lbs. per square inch. Therefore, in unloading, it is only necessary to make suitable connections to the eduction pipe valve outlets to permit the liquefied gas to flow to the storage tank or machine where it is to be stored or used. Connecting lines from the tank car should be made of high pressure steel tubing, fittings and valves, capable of withstanding 300# per square inch pressure and should contain an expansion loop to allow a certain amount of line flexibility. Gas masks provided with the correct type of canister should be provided for all operators in case of emergency.

Chlorine

Liquid chlorine, although differing materially from ammonia, is shipped in the same type of tank car equipment (I.C.C.-Class 105)—heavy welded steel tanks covered with insulation and an outside metal protective sheet steel covering. The domes are the same as used for liquid ammonia cars and carry under a substantial

cover the two liquid chlorine valves and two for the discharge of gaseous chlorine. A 200# pressure gauge may be advantageously connected to one of the gas line outlets. Liquid chlorine is unloaded from tank cars by its own vapor pressure, simply by opening up the dome discharge valves after suitable line connections of extra heavy flexible copper tubing have been made. In extremely cold weather when the vapor pressure becomes low, it is often necessary to warm the car by passing steam through coils provided for the purpose. These coils are next to the tank shell and under the insulation. Low pressure steam is introduced into one



A typical set-up which allows for thawing out frozen bottom outlet nozzle, and which does not require workman to crawl under car while operation is being carried out.

end of the coil and the other left open so that no water may remain in the coils. When heating a car of liquid chlorine, the pressure gauge on the car should be carefully watched and as soon as there is an indication of pressure building up on the car the steam should be turned off. Steam should not be left on car coils unless the operator is present at all times.

Another method frequently employed in unloading liquid chlorine during cold weather consists in using air pressure instead of increasing the vapor pressure of the chlorine itself by the application of heat. The air used must be thoroughly dried by bubbling through concentrated sulphuric acid or by being brought into intimate contact with solid calcium chloride. A comparatively small air line leading to one of the vapor connections on the tank car dome will furnish all the air necessary. This method has the advantage over heating the contents of the car in that it is much easier to control and such close supervision is not required.

The usual pressure reducing valve, safety pop valve, pressure gauge and control valve should, of course, be located in the dried air supply line.

Suitable gas masks should, as in the unloading of liquid ammonia be provided for each operator.

Sulfur dioxide, propane, butane and ethane are shipped in the same type of cars and are unloaded in a similar manner, special fire precautions being taken, of course, where the loading is of a flammable nature.

For unloading propane either reciprocating or rotary pumps are recommended. Butane, by reason of its lower vapor pressure is perhaps best unloaded by the pressure of either air or natural or artificial gas. If steam is available it may be used on tank car coils external to the shell, with butane, to increase the vapor pressure and permit unloading in this manner. For handling any flammable solvents, all pump motors should be of the explosion proof type.

Explosive and Flammable Loadings

This very broad classification includes practically all the commercial solvents, with the exception of carbon tetrachloride which is neither explosive nor flammable.

Many of these, such as gasoline, benzol, the naphthas, toluol, and xylene have been shipped in the ordinary steel tank cars for many years. They are generally unloaded through bottom discharge openings by either gravity flow or by pumping. Air is not commonly used to unload flammable materials, as mixtures of the vapors and air are often very explosive. Care should be taken to see that workmen do not inhale the fumes of the volatile loadings, as nearly all have toxic effects.

In addition to the general safety methods outlined at the beginning of this paper, particular attention should be given to eliminate all fire hazards and possible sources of sparks which might ignite the vapors. Vented manhole covers or air vents should be covered with wet burlap while the car is being unloaded. Tools and wrenches should be handled carefully to avoid the possibility of sparks being produced. All cars carrying volatile solvents and compressed flammable gases should be thoroughly grounded.

Carbon bisulfide is typical of many of the low boiling point solvents now transported by tank cars. Its vapors are not only very toxic, but when mixed with the right mixtures of air, extremely dangerous from an explosive hazard. It can be unloaded by the gravity or pumping methods previously mentioned or in cases where it is possible to do so without fear of rendering the product unfit for use, it is recommended that cars of this product be unloaded by the water displacement method. Essentially this consists in applying water at not over 30 lbs. pressure, to force the contents of the car through the eductor pipe into the storage tanks. A slight glass in the discharge line indicates to the operator when the solvent has been entirely discharged from the car. The water filled car is then drained to a sewer. Needless to say, this method is only applicable where the solvent to be unloaded is appreciably heavier than and not miscible with water.

Needless to say, in permitted length and scope of this paper it was found to be impossible to give complete and minute details for the unloading of each and every product today shipped in tank car equipment, but the writer hopes that the general ideas set forth here may prove of interest to those having to do with this modern method of loading.

What is the Scope of a Chemical Invention?

By Charles W. Rivise

Caesar and Rivise

IN a previous article (Scope of a Chemical Patent, CHEMICAL INDUSTRIES, October, 1934), the inventor was cautioned against rushing to the Patent Office with an incomplete invention or before he had had ample opportunity to ascertain the full significance of what he had invented. In the present article the author intends to discuss a few simple rules by means of which the inventor or assignee can ascertain the full significance of his invention, so that he can best cooperate with his patent attorney in securing a valid patent of the broadest possible scope.

Fully to understand the significance of his invention and its scope, the inventor must view it in its true relation to other existing devices of the same kind. An investigation of the patent and technical literature is always indispensable in this connection. Searches of the records of the Patent Office are usually made to determine the advisability of applying for a patent. Such investigations are termed preliminary searches and the patents uncovered give the inventor some idea of the scope of his contribution and enable him to more intelligently prepare and prosecute the application. The Patent Office has copies of most of the patents granted by the more industrial countries of the world and many technical publications, but preliminary searches are, as a general rule, restricted to domestic patents contained in the most pertinent Patent Office classes. The reason is that it is often less expensive to file an application than to make a thorough and exhaustive search. In many instances, cursory investigations do not reveal the closest and most pertinent prior art. As a result, inventors are frequently disappointed by having their applications rejected, or their patents invalidated on references that should have been uncovered in the preliminary search.

The logical time for making the prior art investigation is not after the invention has been made, but before the actual research work on a given problem has been started. Such a search should also be made before acquiring an interest in an invention, whether patented or unpatented, and before deciding what course of action to take in a threatened infringement suit.

A search before serious work is begun on a new development will enable the research worker to start where his predecessors had left off and may prevent him from wasting his energy in the duplication of previous effort. It will furnish invaluable information as to the state of the art, show what mistakes to avoid and suggest improvement. It will also uncover subject matter that may be freely used; i.e., disclosures of foreign and expired patents and of patents dedicated to the public, as well as the unclaimed subject matter of domestic patents. It will furthermore show what is protected by live patents and thus enable the research worker to avoid devices and processes that may lead to expensive infringement suits. Often it is possible to obtain such patents, especially if they are not being worked for a nominal sum and thus procure a ready-made entrance into the field. In any event a thorough search serves to indicate the tendency for future development and may be utilized to guide research work so that it will be directed away from fields that are impeded by hostile patents and into channels most likely to bring productive results.

The investigation should not be limited to devices that have actually been on the market. For, until very recently, engineers were exceedingly slow in taking up new ideas for the improvement of their fields. Hence, many valuable ideas disclosed in patents and printed publications have been overlooked by inventors and engineers and have, therefore, had little or no effect on the arts. Frequently, one of these ideas is rediscovered and a search proves it to be old. The patent records in Washington constitute a veritable mine of valuable information and in a great many instances are the only source of information to these neglected inventions. In any event, the patent literature affords the most thorough and complete history of the technical arts. Usually patents contain the first published knowledge of a subject and are often years in advance of other technical literature.

An investigation may well start with text books and technical articles covering the art in question. In this manner it is possible in a relatively short time to gain a comprehensive history of the development of the art,

* *Copyright 1934 by Chas. W. Rivise.*

which will not only disclose basic patents but will also indicate what foreign patented art offers the most likely field of investigation. References to text books and periodical literature may be obtained from such valuable reference works as *Chemical Abstracts, Industrial Index, Engineering Index* and *West and Berolzheimer's Bibliography of Bibliographies on Chemistry and Technology*. A few industries are fortunate in being provided with comprehensive bibliographies. Undoubtedly the best of these is *West's Bibliography of Papermaking* sponsored by the Technical Association of The Pulp and Paper Industry. By the aid of one or more of these works the research worker may find the key to excellent patent reviews covering particular arts, of which too few have been published in English.

Searching the Technical Literature

The search through the technical literature may well be made by the research worker himself, as he is usually familiar with his own art and its nomenclature. The investigation of the patented art should be left to patent attorneys and competent searchers versed in the language of patents and the Patent Office system of classification. The file wrappers and contents of the most pertinent patents, i.e., the official records of the Patent Office prosecution, should also be studied. Much valuable information as to the state of the art and the scope as well as probable validity of issued patents may be gained in this manner.

The prior art search cannot be made to extend to pending patent applications, as they are preserved in the strictest secrecy. And, since many important applications are kept pending for years, the most exhaustive and thorough search is necessarily incomplete. However, since patents are as a general rule issued much more promptly abroad than in this country, it is often possible, by making a search of the recent foreign patented art, to gain some idea of the subject matter of pending applications.

Assertions in technical literature, unless their truth be obvious, must not be accepted without verification. Especially is this so in the case of patent specifications. Inventors, in their anxiety to obtain patents of the greatest possible breadth or scope, are inclined to insert into the specifications of their applications statements having little or no foundation in fact as well as conclusions based upon insufficient experimental data. Even the late wizard of Menlo Park was subject to this failing. Referring to one of his many patents, the Court of Appeals of the Second Circuit in General Electric Co. v. Nitro Tungsten Lamp Co., 1921 C. D. 249; 282 O. G. 195; 266 Fed. Rep. 994, had this to say:

"To us it seems fairly certain that both the commercial and the theoretic art had been put on the wrong road by Mr. Edison through the disclosure of his Patent No. 274,295, when in 1883, he proposed to fill a carbon-filament bulb with an 'inert gas', viz., nitrogen, at a pressure of about two-thirds of an atmosphere, and stated, as one of the means of his hoped-for success that—the filament before carbonization may be reduced to a smaller cross-section than usual heretofore in order to produce reduction of radiating surface. This was unquestionably wrong. . . ."

"Arm Chair" Inventors

It must also be borne in mind that many patents are taken out by the so-called "arm-chair" inventor. This type of individual makes it a practice to seek patent protection on every conceivable variation and application of newly developed devices and compositions on mere speculation, in order to preempt without delay or expense of experimentation something which he hopes may some day form the basis of a valuable patent. And, unfortunately, the Patent Office has neither the time nor the facilities to ascertain the truth or accuracy of the statements made in applications submitted for its consideration. As a consequence, many patents have been granted which are utterly impractical and teach little or nothing.

Then again, the fact that a study of the prior art appears to indicate that a certain problem had been repeatedly investigated without particular success must not be taken as proof that the problem cannot be solved. Frequently a successful solution requires the discarding of preconceived notions and a departure from the beaten path. And, as is well known, workers in an art have a decided tendency to cling slavishly and tenaciously to prior art teachings. It is not surprising, therefore, that many problems are solved by outsiders and by those who do not have too detailed a knowledge of the art. They are, as a general rule, free of the traditions and inhibitions that hamper the thinking of men on the job. However, this is no reason for not making a full and detailed study of the prior art before undertaking the solution of a problem. Lack of information as to the state of the art, as has been pointed out, invariably leads to a waste of effort due to the duplication of previous work.

In this connection, it is to be noted that it requires a considerable amount of good judgment and a fine sense of discrimination to sift from the chaff of prior art teachings the relatively few grains of worthwhile information. Also that it requires a great deal of moral courage and enterprise to break away from a prior art method or device having but limited practical possibilities and resort to one based upon a principle previously considered impossible or preposterous.

The first step in determining the scope of an invention is, as has already been pointed out, an exhaustive search of the prior art. With the results of such an investigation before him, the inventor is in a position to view his invention in its broadest aspects and to ascertain the essential characteristics that distinguish his device or process from those disclosed in the prior art as well as to determine the underlying principle of his invention. To do this, he must, as far as is possible, in view of the

prior art, disregard the specific peculiarities or form of his device and look upon it not as the invention itself, but as merely one of the many possible forms in which his inventive concept may be embodied. The inventor should also endeavor to single out the element or group of elements to which can be ascribed the new or modified result produced by the invention. These elements will hereafter be termed the primary factors of the invention, for they are the effective causes of the desired result. The remaining elements provide the operative environment for the essential elements or primary factors and are, hence, termed secondary factors or dispensable elements.

Elements to be Omitted

In carrying out this process, the inventor must regard the elements of the device not as gears, levers, switches, resistances, etc., but as means to perform their functions. This will also enable him to determine which elements may be omitted, modified in form or replaced by some equivalent instrumentality. A simple expedient is to set down the elements of the device in a single vertical column and mark down opposite each element its function. Some prefer to express the function in the form of a means clause, in which case one element or a group of elements which performs a unitary function, i.e., a subcombination, may be expressed as a single means. A comparison of the list with the prior art references uncovered in the Patent Office search serves to indicate whether the essence of the invention resides in one or more new elements or in a new arrangement of several old elements.

The next step is to ascertain to what extent the arrangement or relationship of the elements may be varied without departing from the underlying principle governing their operation and what changes in the arrangement of the elements may be necessary in order to modify or replace one of the primary factors. This serves to establish the essential physical conditions under which the invention may be practiced. Finally, the inventor should take steps to determine how the invention may be applied in various fields.

The analysis of the invention and the determination of its scope may require extensive engineering and research with the assistance of competent technicians and consulting experts. The assistance of consultants is preferable to that of workers in the art, for consultants are generally possessed of an independence of viewpoint which enables them to view an invention in its true perspective. The failure to properly analyze an invention has frequently resulted in a broad invalid patent or in a narrow patent that can be easily evaded by a competitor. Especially is this true of chemical inventions.

The mechanism of determining the broadest aspects of a chemical invention does not differ essentially from that of any other invention, but it requires a thorough knowledge of chemical nomenclature and classification as well as of chemical reactions. The procedure may well be illustrated by means of Patent No. 1,731,485.

The patent discloses a method of producing a rubber composition by treating rubber with one of a number of compounds including sulphuric acid, sulphonic acid and sulphonyl chlorides. It is very unlikely that the inventors (Geer and Fisher) hit upon all the reagents at the same time. Probably they first found that a desirable composition was produced by treating rubber with sulphuric acid. Sulphuric acid may be classed broadly as an acid and more specifically as a mineral acid. A few experiments were sufficient to indicate that the property of sulphuric acid which enabled it to react with the rubber in the desired manner was not characteristic of all acids or of mineral acids only. A less skilled chemist than the inventors would probably have concluded that the reaction was individual to sulphuric acid and filed the patent application under that theory. But the inventors knew the sulphuric acid can further be classified with compounds containing the SO_2 radical, for its structural formula is OH-SO_2-OH. The inventors, therefore, tried out a reasonable number of compounds that can be classified under the general formula R-SO_2HX and it was, then, merely a matter of laboratory routine to determine that any compound falling under the general formula would serve provided R represents an organic radical or a hydroxy group and X stands for chlorine or a hydroxy group.

Dyeing Viscose Rayon

For the production of colored rayon of the regenerated cellulose type a new method is discussed by the inventor, Henry Dosne, in *La Revue Générale des Matières Colorantes*, August, 1934. Process, at present, is under exploitation in France. Few details are given, but mention is made that use is made of certain ether-salts, which are not coloring matters but which are capable of being transformed into dyestuffs by oxidation under acid conditions.

These ether-salts possess the important property of being perfectly soluble in water, and are stable to air, alkalies, and weakly acid conditions. They are entirely unaffected by reducing agents and by oxidizing agents in alkaline or neutral conditions. If a solution of the ether-salt is incorporated with the viscose mass before spinning, the properties of neither the ether-salt nor the viscose itself are in any way modified. The addition can take place at any desired stage in the viscose process before actual spinning. Certain of the ether-salts have a marked affinity for cellulose which manifests itself immediately the regenerated cellulose is precipitated by acid in the spinning bath. The filament obtained after passage through the oxidizing acid bath is submitted to the usual finishing operations. One of the oxidizing methods used comprises the incorporation in the viscose before spinning of an oxidizing agent inactive under alkaline conditions but active under acid conditions. By working in this way, the color is developed at the same time as the cellulose is regenerated. The subsequent operations of desulphurizing and finishing can be carried out normally. Costs of the process are low; pale shades are obtainable with the smallest quantity of coloring matter, and even with heavy shades there is no wastage of dyestuff. The only indication given as to the type of dyestuff used is the reference to the sulfuric ether salts of the leuco derivatives of the vat dyestuffs. *The Chemical Trade Journal.*

How Long Should We Work?

By M. C. Rorty

President, American Management Association

MANUAL workers can work, readily and continuously, at least one hour a day longer than mental workers, and with no greater strain or risk of injury to health. Working hours of more than forty-four per week are somewhat less effective *per hour* for manual work involving serious effort or close concentration, than when the forty-four hour week applies. Below forty-four hours of work per week the increase in production *per hour* is not, however, so significant. A forced reduction in working hours often leads to a corresponding forced speeding up of pace and to the introduction of labor-saving devices, but this is a separate factor from the innate ability of the average worker to maintain normal working speed for forty-four hours a week.

The tendency in the past has been for workers unconsciously to choose about a 50-50 split between added leisure and added real wages. This has been evidenced by the steady downward trend during the past half century from a normal working week of sixty hours to one now of perhaps forty-four. The demand of labor unions for much shorter hours is so mixed with their belief that their members can bargain more effectively with such shorter standard working periods, and with their further belief that there is not enough work to go around, that it is not wholly significant. The more responsible workers want a length of day which allows normal living and moderate leisure, but, with a fixed hourly rate of pay, will usually choose about a forty-four hour week, if that provides a reasonable margin over the cost of decent living. Improvident workers, will, however, choose shorter hours.

The preceding impressions have been garnered in nearly forty years' experience as worker and employer, which experience has ranged from a sixty-hour week with (personal) pick and shovel, through positions as foreman and upward to large scale executive work. The writer's present estimate is that, with pay pro rata, or substantially pro rata, according to hours worked, the natural trend with increased efficiency of production will be somewhat more slowly than in the past toward a five-day week, with hours for manual workers ranging from a little under to a little over forty in different localities, according to the size of the community and the travel time required to and from work. Brain workers will probably continue to work about one hour a day less.

The problem of working hours in highly mechanized industry is often considered as a question apart from that of working hours for the population as a whole. It is, however, essentially unfair that we should have specially favored groups among the working population, with specially short hours obtained at the expense of higher prices for goods purchased by those who are not so favored. With due allowance for the varying conditions in different localities and occupations, the benefits from improvements in science and technique should be spread fairly throughout the whole population as a general reduction in working hours. Of course, it would be very pleasant for the machine operator to work six hours a day while the farm worker toiled for ten hours or more—but it would be socially much more desirable if each had the same proportionate reduction in working time.

Studied from the preceding angle, it is, perhaps, a roughly sound conclusion that, with average productivity per man-hour increasing at the rate of about 2 per cent. per annum, working hours should decrease about 1 per cent. per annum, and weekly real wages should increase by an equal 1 per cent. This is sound economics, plus, perhaps, a reasonably exact estimate of the split between leisure and real weekly wages that the average worker would choose if he were able to make such choice in clean-cut form, without being confused and fogged by fallacious pleadings and arguments.

Of course, if we could largely increase our per capita productivity overnight, the picture would be different, but, at any given time, only about 5 per cent. of the working population are engaged on operations which would lend themselves to radical savings through mechanization. In the course of years, the mechanical changes are extensive, but these changes seem normally to come by successive small steps, rather than in those wild leaps of which the technocrats dream.

Today, however, we are confronted with a wholly forced and unnatural condition. Employers, faced with arbitrary wage increases and limitations of hours, are compelled, in self-protection, to expedite the processes of technological change far beyond the normal. The technocrats' dream has become the nightmare of a new and very genuine, even if wholly artificial, technological unemployment. Testimony to this effect is widespread. The circle is a thoroughly vicious one. Shortened hours and increased hourly rates of pay result in a combination of higher prices, reduced demand, and forced increases in productive efficiency—and the process then repeats itself, with employers and employees equally helpless to control the situation. To determine the exact weight of the new burden which is thus being imposed on our struggling economy is impossible—but the seriousness of the situation cannot be disregarded. Technological changes which come in their natural course are national assets—but forced technological changes may become dangerous liabilities.

BETTER LEVELING LACQUERS

A MAN well known as an expert in the formulation of high quality lacquers recently remarked that he sincerely believed that the Sharples Process for Better Leveling Lacquers is the most important contribution to the lacquer industry since the introduction of low viscosity cotton. We realize that this may be a rather broad statement. We hope he is right. Anyway, *we do know* that the interest shown by the entire lacquer industry indicates the importance of a careful study of this process by anyone confronted with coating problems . . . Our Laboratory will gladly cooperate.

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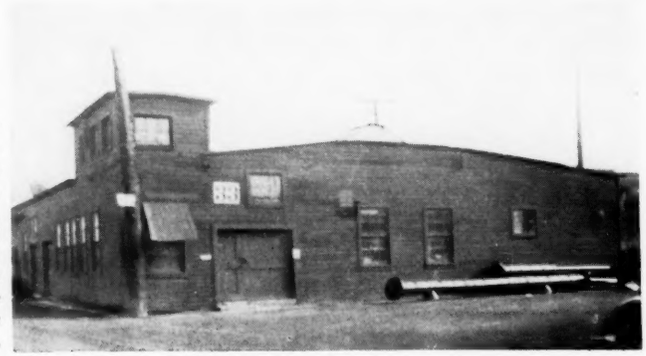
CHEMICAL

The Photographic Record

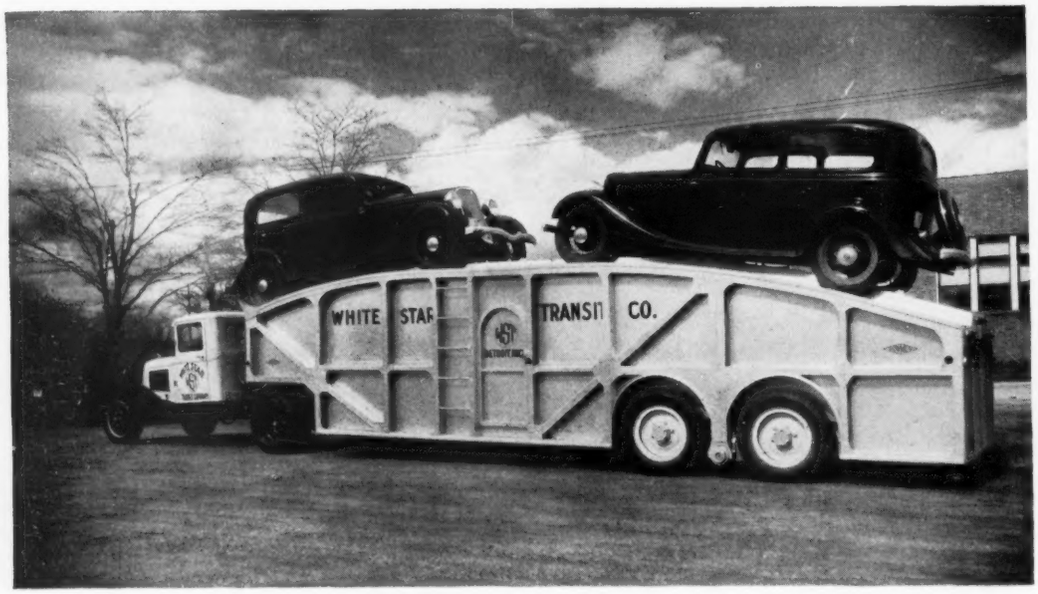
Left, M. L. Bettcher, formerly General Superintendent, who has been appointed to the position of General Manager, of The Duriron Company, large manufacturer of equipment for the chemical and process industries. Mr. Bettcher joined the company in 1920, starting as a salesman in the Chicago district.

Showing one of the new semi-scale manufacturing laboratory buildings at the Niacet plant in Niagara Falls, as an example of a number of these development process buildings erected during the past year in the industry.

At the plant of The Carborundum Company, in Niagara Falls, can be seen the first electric brick furnace, made by Dr. Acheson for the manufacture of silicon carbide.



Only one of original wooden buildings at Dow plant, in Midland, Mich., which is still standing. Built to house the chlorine caustic plant, now the carpenter shop.



A four-car chassis-less semi-trailer, built almost entirely of Dowmetal. Trailer weighs only 4,400 pounds, and has a return load capacity of eight tons of bulk freight. Weight reduction of approximately 25 per cent. has been made as compared to bodies built of other light alloys, and of approximately 75 per cent. as compared to the old orthodox wood and steel construction.

NEWS REEL

of Our Chemical Activities

On the front line of sales all over the country are a group of chemical distributors and we have collected the photographs of some of these men whose names and signatures are so well known throughout the industry.

Edwin C. Ecclestone, Ecclestone Chemical Company, Detroit, Mich.

Above, C. P. Hall, C. P. Hall Co., Akron, Ohio. Left, Dwight R. Judson, Hartford, Conn.

John F. Wischhusen, Sales Manager, Harshaw Chemical Company, Philadelphia, Pa.

Right, Fred L. Brooke, Chicago, Ill. Below, Albert A. Harrison, President, Borden and Remington Company, main office, Fall River, Mass.

Above, Richard C. Hedke, Manager, Chemical Sales Department, Eaton-Clark Company, Detroit, Mich. Right, Harold J. Rolls, Rolls Chemical Company, Buffalo, N. Y. Below, Robert Mulligan, Manager, J. U. Starkweather Company, Providence, R. I.

THE birth of large industries took place in the Laboratory. Industry's great forward surges were made possible by the patient labors of the Chemist. And Chemical Research will point the way to tomorrow's industrial achievements.

New materials, new processes form the foundation for new and better products and make them available to greater numbers of people.

In this inspiring work Swann Research plays an active part, constantly improving the purity, the uniformity, the dependability and adaptability of Swann Products—thereby enabling you to produce better—and very often more economically. Our nearest office will gladly serve you.

PARTIAL LIST OF SWANN PRODUCTS

Phosphoric Acid 75%
Phosphoric Acid 50%
Mono Sodium Phosphate
Di Sodium Phosphate
Tri Sodium Phosphate
Sodium Pyrophosphate
Mono Ammonium Phosphate
Di Ammonium Phosphate
Mono Calcium Phosphate
Di Calcium Phosphate
Tri Calcium Phosphate

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Chemical Consumption

A digest of new products and processes in process industries for the user of chemicals.

Oiticica — New Varnish Oil

By Dr. H. A. Gardner

One of the activities of the Scientific Section of the N. P. V. & L. Ass'n has been to search the world for raw materials that can be used in varnish making and other products of the industry. Last summer I went to Brazil and brought back trunk loads of specimens.

The most interesting is a particular oil called oiticica oil. These trees grow profusely in this locality and produce in the fall, a fruit in the form of a nut, containing a very large percentage of oil. Some of the trees produce two tons of fruit, an extraordinary quantity.

The fruit contains about 60% of this oil which is very similar to china wood oil, and it appears to have a very wonderful future in our own industry.

At present the methods of crushing the oil in Brazil are rather crude. They use two types of mills. One is of the traction type; one of the pressing, and to date they are only pressing about two thousand tons a year, at the most, and there is very little use for the oil.

Some has been shipped to Germany and some to England. The crude method of paint manufacture in Brazil has precluded its use there. Experiments with it have yielded poor results because of the fact that the crude or raw oil wrinkles very badly and forms a film.

Because of the lack of industrial chemistry it has been impossible to find out how it can be used successfully and profitably. We have found, however, in the brief studies we have made, the simplest way to treat it. The oil is put in a kettle, with a resin, natural or synthetic, and cooking the oil overcomes all wrinkle phenomena.

This oil is a varnish oil that can be used to take the place of china wood or be used with china wood oil in the production of quick drying oil. The amount available in South America will be very large. This year's crop is probably the largest they have ever had. Production this year amounted to something like one hundred million barrels of oil without any difficulty.

Address before convention of National Paint, Varnish & Lacquer Assn., abstracted from Paint, Oil and Chemical Review.

The oil is bound to come into our industry in the very near future for the manufacturing of all types of varnishes, and while it may not take the place of china wood oil entirely, it can be used in place of it, and doubtless will be.

The price of the oil is substantially lower than china wood oil. There is no duty on its entry into this country, and the main producers of it have a freedom from experiment taxes. In fact, they have a stipulation from the government that is good for at least fifteen years more to the effect that no taxes will be placed on the oil by the Brazilian Government.

That is a remarkable concession in view of the fact that in Brazil they place taxes on practically everything that comes in and goes out. It looks as though we have, in Brazil, at present, a tremendous quantity of oil that so far in experimental work has been found to do many of the things that china wood oil does. As to the percentage that will be used—it is probable that three or four parts of this oil to one part of china wood oil will give the best results.

My idea was to go down there and get the seed and plant it in this country or another, but I thought that was very far-fetched because the tree grows slowly and takes about fifteen years to produce fruit. It grows, in Brazil, from fifty to one hundred years, indicating the age to which it attains. Nevertheless, I did bring back seed with me, and I have planted it in something like twelve different places, in Louisiana, in Florida, and in Cuba, Porto Rico, the Philippines, and the Hawaiian Islands.

While we have started our experimental planting with that seed, we must look to Brazil to supply us with any quantity of the oil that we are going to need for at least twenty-five years to come.

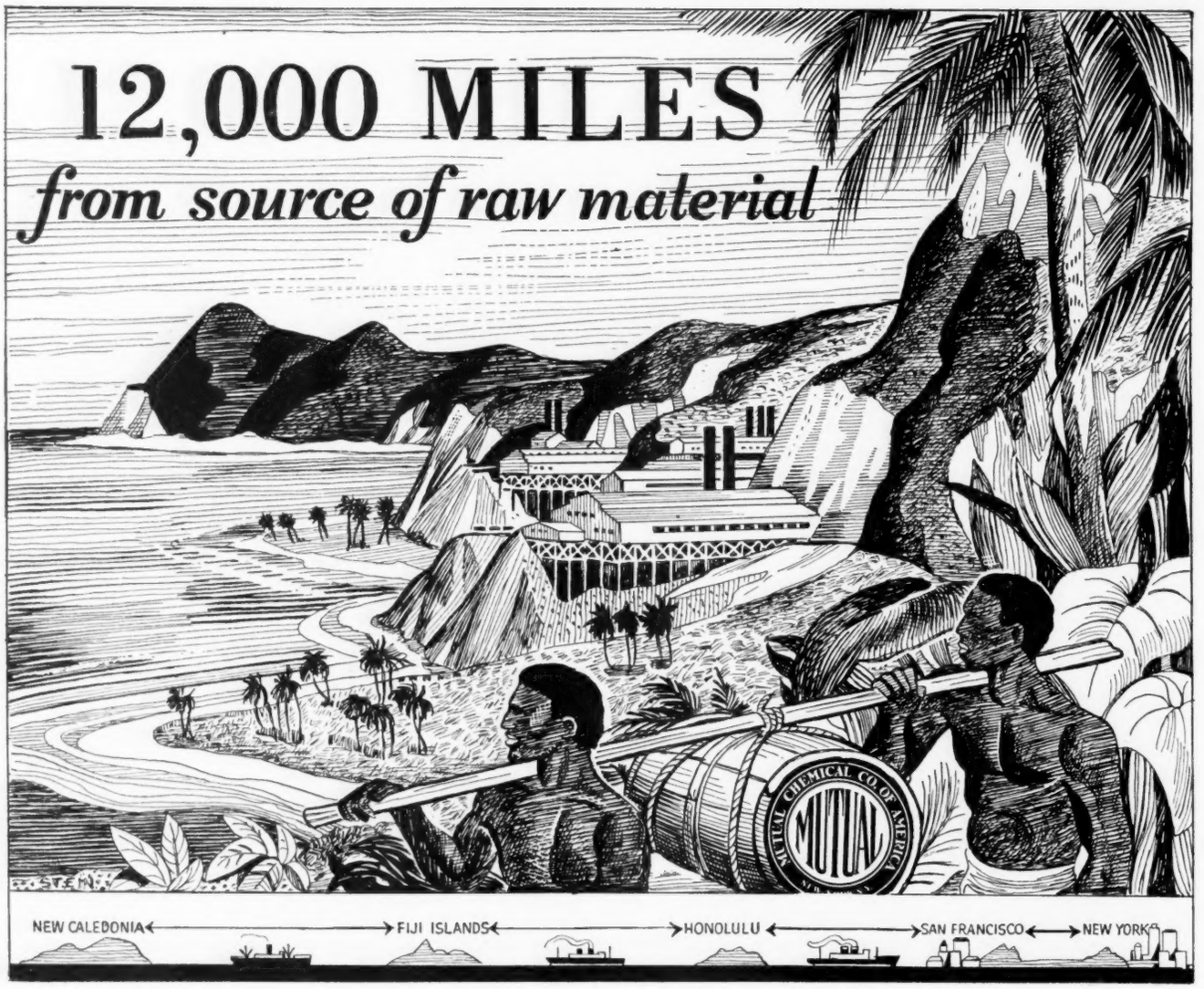
Since there is such a tremendous amount of this oil available there, and readily available at any time you want it, it would appear that it would not take very long to introduce it into the various formulae which you are using today in the manufacture of coatings.

In passing I want to say that the work on tung oil is being carried on in Louisiana. A great stimulus has been given to it by the fact that the FERA has recently appropriated a substantial sum of money to plant something like ten thousand acres of tung trees around the Gainesville district.

There is also great activity on the part of the Home Loan Board in Louisiana, in the planting of trees, and they have apparently put up the money during the past year to build a china wood oil crushing plant right north of New Orleans, to take care of the crop of the farmers who have located in that district.

They now propose to erect another crushing plant to take care of the crop in Mississippi.

It looks very hopeful that the experimental work in tung oil producing in America will some day bear fruit. This year there



Chrome Ore Mines of the Mutual Chemical Co. in New Caledonia

Chrome ore is the basic raw material from which all Chrome chemicals are made.

The French island of New Caledonia in the South Seas contains the World's richest known deposit of Chrome Ore.

The above pictured mine is owned and operated by the Mutual Chemical Co. and is the source of the Ore used at its plants in Baltimore and Jersey City for the manufacture of Bichromates and Chromic Acid.

The control of this basic raw material gives Mutual a uniquely strong position and provides worthwhile protection to all customers.

Bichromate of Potash
Oxalic Acid

MUTUAL CHEMICAL CO. OF AMERICA
MUTUAL
NEW YORK N.Y.

Bichromate of Soda
Chromic Acid

MUTUAL CHEMICAL CO. OF AMERICA
270 Madison Avenue, New York, N. Y.

Factories at Baltimore and Jersey City **Mines in New Caledonia**

will be only a few thousand gallons, probably a million pounds of fruit crushed, or at least a half million pounds of fruit, but that is only a drop in the bucket. We need at least 50,000 gallons, at least 12,000,000 pounds per year, to do any great amount of good, and that is away in the future. We will get it some day, but it means slow work, and we must be patient until it does come in.

Paints, Lacquers and Varnish

U.S.P. 1,978,141 relates to a dry powder cement and water paint to be mixed with water before using. Ingredients comprise a Portland cement, mineral filler, and a quantity of calcium hydroxide and aluminum sulfate, which when reacted together by the addition of water will produce not more than about 20% hydrous aluminum oxide, and not more than about 3% calcium sulfate. Amounts used are based on quantity by weight of cement used, the calcium sulfate acting as a retarding agent for the setting of the cement. In the last step, a casein and formaldehyde, which will form with the casein a product high in water resistivity, are used; sufficient casein being employed to absorb any excess lime present.

Lecithin

A new form of Lecithin, instantly and thoroughly miscible with water, oil, or mixtures of the two, is being commercially developed, and will be announced shortly. Increased economy, ease of application, and utility in many cases where the present oleaginous lecithins cannot be satisfactorily used are indicated for the new product.

Patents—Coatings, Paints, Varnishes, Lacquers

Preparation coating composition, to be applied to surfaces of fibrous materials, forming a transparent film; being mixture containing gelatin and the reaction product formed by heating glycerine and phthalic anhydride. No. 1,978,406. Chas M. Boyce, Cedar Rapids, Iowa, to John R. Ditmars, New York, N. Y.

Process for a dry powder cement and water paint preparation. No. 1,978,141. Wm. P. D. Moross, Chattanooga, Tenn., to American Cement Paint Co., Rossville, Ga.

Production of a wire enamel, consisting of a drying oil, a resin, and a solvent composed of a hydrogenated petroleum product, which is a hydrogenation fraction boiling from 200 to 600° F. No. 1,977,932. Wm. Howard Wright, Schenectady, N. Y., to Schenectady Varnish Co., Inc., Schenectady, N. Y.

Process for material impervious to water, being a reaction product of cashew nut shell liquid, and an alkaline material, to completely react with the free acid and any glyceride thereof. No. 1,977,826. Mortimer T. Harvey, East Orange, N. J., to Harvel Corp., New Jersey.

Manufacture resins for lacquers, varnishes, etc.; comprising an oil modified polyhydric alcohol-polybasic acid resin and phenol-aldehyde resole. No. 1,977,652. Norman Strafford and Eric Everard Walker, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Method preparing plastic composition for the manufacture of conduits and other articles by extrusion; composition consisting of cement, clay or the like, and asbestos in dry form. No. 1,977,158. Geo. S. Thurman and Karl T. Romie, Oakland, Cal., to Fireproof Wall Co., Oakland, Cal.

Process preparing and applying a protective coating to a surface of a structure; coating being a drying oil mixed with powdered sulfur. No. 1,976,807. Elmer R. Shaeffer, Crestwood, N. Y., to Philip Carey Mfg. Co., Ohio.

Manufacture resin; consisting of reaction product of formaldehyde, a mixture of meta-para cresols and a coal-tar acid containing certain amount of xylenol. No. 1,976,572. Gerald H. Mains, Murrysville, Pa., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Preparation emulsion containing a heat-reactive phenolic resin; by reacting phenolic body and a methylene agent to form resinous product, running reaction product directly from reaction zone into water to form a suspension and simultaneously arrest the reaction. No. 1,976,433. Harold C. Cheetham, Milwaukee, Wis., to Bakelite Corp., New York, N. Y.

Process producing a wrinkled finish coating with a resin finish. No. 1,976,191. Frank Brian Root, East Orange, N. J., to Chadeloid Chemical Co., New York, N. Y.

Process for a solid drier for coating materials. No. 1,976,182. Friedrich Meidert, Frankfort-am-Main-Griesheim, Germany, to I. G., Frankfort-am-Main, Germany.

Process for strong, transparent, waterproof sheet material, comprising a thin gelatine base, a reticular fabric body incorporated in base, and a continuous coating of cellulose ester. No. 1,976,028. Edouard M. Kratz, Chicago, Ill., to Marsene Products Co., Gary, Ind.

Process for transparent self-sustaining sheet, comprising a gelatinous base having a waterproof coating of cellulose nitrate, cellulose acetate and tricresyl phosphate. No. 1,976,027. Edouard M. Kratz, Chicago, Ill., to Marsene Products Co., Gary, Ind.

Process preparing a resinoid composition; by reacting phenol, including o-cresol, with hexamethylenetetramine, and a plasticizing agent. No. 1,975,884. Geo. S. Weith, Caldwell, N. J., to Bakelite Corp., New York, N. Y.

Production oil paint resistant to yellowing; comprising a pigment, of the class of white and light colored pigments, and sunflower seed oil. No. 1,975,783. Chester G. Gauerke, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method making an insulated electrical coil; by extruding on an electrical conductor a definite thickness of flexible alkyd resin. No. 1,975,750. Moyer M. Safford, Schenectady, N. Y., to General Electric Co., Schenectady, N. Y.

Process for simultaneously increasing the fastness to light of lithopone and reducing the "feeding." No. 1,975,716. Joseph Guillissen, Brussels, Belgium.

Method for improving white pigments containing titanium and iron. No. 1,975,339. Foord von Eichowsky, Glendale, Cal.

Method production drying oil. No. 1,975,211. Alan C. Johnston, Wilmington, Del., to Hercules Powder Co., Wilmington, Del.

Preparation styrol varnish comprising a major portion of a meta styrol and a minor portion of a softener, cumar resin, and a volatile solvent. No. 1,975,179. Omar H. Smith, West Englewood, N. J., to Naugatuck Chemical Co., Naugatuck, Conn.

Process making chlorine-free synthetic resins, by reacting vinyl chloroacetate with the alkali metal salt of an OH containing organic compound of the class of alcohols, phenols, and carboxylic acids, and polymerizing. No. 1,975,087. Harry B. Dykstra and Walter E. Lawson, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Textiles

General Dyestuff releases include Celliton Discharge Violet B, a new dischargeable violet for acetate silk, also recommended for direct printing. Eunaphtol AS, for use in pasting up and dissolving the entire range of Naphtols. Being in the form of a single product, combines all the good qualities of the large number of auxiliaries recommended for this purpose. Featured characteristics are: excellent resistance to lime; very high protective colloid action and good wetting out properties. Prevents floating of material, and has a favorable influence on the fastness to rubbing of the dyeings. Naphtol AS-L4G, represents the latest addition to a series of yellow Naphtols, which in combination with suitable bases or diazo salt produces clear shades from a greenish to a reddish character. Is of low substantivity, readily soluble, and excellently suited for the padding method at a temperature of 120° F. These are the first Naphtol yellows which can be discharged to a white.

Also in the General Dyestuff new offerings is Indanthren Yellow 7GK Powder Fine For Dyeing, of greenish yellow shade. Its good fastness to hot pressing, water spotting, and perspiration, make it important for piece dyeing, especially as it is also suitable for application by the pigment-padding process. Vatting properties as well as solubility are good, and make it of interest for machine dyeing. Fastusol Orange L3RA, valuable for self shades as well as for combinations, either on rayon or cotton. Levels very well, does not stain acetate silk, and can be discharged to a good white with Rongalite C. Brilliant Indo Carbon CLB, considerably bluer in shades than the older Indocarbon CL Conc. or CLG Conc. brands. Can be used in machines for cotton and rayon in various stages of manufacture. Because it withstands acid cross dyeing, is particularly suitable for dyeing of warps for unions.

Control Dye Affinity

A new process for treating mercerized yarns to control dye affinity is announced by the Ewing-Thomas Corporation. Process, described as mechanochemical, controls the basic structure of the yarn and for the first time makes available to the knitting trades mercerized yarn with heightened or retarded affinity for dye. It is expected to prove of value in all fabrics fields wherever combination of fibres with mercerized cotton is used and proper union dye an important consideration.

Determining Calcium Soap on Textile Fibers

Dr. Bernard H. Gilmore, of Mellon Institute, recently concluded an investigation of the determination of calcium soap on textile fibers, and last month presented his report before the Northern New England Section of the American Association of Textile Chemists and Colorists. The gist of the report outlined a method, based upon the complete extraction of the total soap by the appropriate solvent, followed by the actual determination of the calcium content of the soap extract. Benzene and carbon tetrachloride were found to be equally efficacious for the extraction of calcium oleate; but these solvents were not efficient for calcium stearate. A mixture of benzene and absolute alcohol (advocated by Marcusson) was proved to be the most effective

solvent for the extraction of the calcium soaps of the saturated fatty acids, hence most suitable for general purposes.

Patents—Textiles

Process treatment natural and artificial fibres; by application of a composition including a mineral oil, a mineral oil sulfonate, an additional emulsifying and lubricating agent, including alkali metal and organic base soaps, and a solvent for the soaps. No. 1,979,188. Aleidus G. Bouhuys, Enka, N. C., to American Enka Corp., Enka, N. C.

Method for treating textiles of any description; dyeing materials, then treating with a neutral, water-soluble, hygroscopic molecular compound of a carbamide. No. 1,979,121. Water Rotta, Zwickau, Germany.

Process for dyeing textiles by vatting methods; vats being maintained at temperatures not much above 10° C. No. 1,978,786. Geo. Holland Ellis, Spondon, near Derby, England, to Celanese Corp. of America, Delaware.

Process sizing textiles and other materials containing an organic derivative of cellulose. No. 1,978,785. Henry Dreyfus, London, and Wm. Alexander Dickie and Percy Frederick Combe Sowter, Spondon, near Derby, England, to Celanese Corp of America, Delaware.

Process manufacture artificial silk; dissolving nitrocellulose, which contains 6% water, in pure methyl alcohol, with final addition of a lubricant. No. 1,978,741. Jacques Delpech and Constantin Heinrich, Amiens, France.

Process for desulfurizing rayon in package form; treating package with an ordinary alkaline desulfurizing solution, to which has been added a reagent, which keeps the iron compounds occurring in the package in a soluble state. No. 1,977,533. Gilbert I. Thurmond, West Asheville, N. C., to American Enka Corp., Enka, N. C.

Method spot dyeing masses of textile material. No. 1,977,338. Louis B. Hasbrouck, Elmira, N. Y., to Eclipse Textile Devices, Inc., Elmira, N. Y.

Process production at least partially delustered yarns containing organic esters of cellulose. No. 1,976,218. Camille Dreyfus, New York, N. Y., and Wm. Whitehead, Cumberland, Md., to Celanese Corp. of America, Delaware.

Method treating textile fibres; by subjection to the action of a single bath including a solution of a colloidal aluminum silicate, albumin and salts of one or more rare earth metals, then heating to evaporate moisture and coagulate the albumin. No. 1,975,493. Wm. H. Alton, New York, N. Y., and Hilton Ira Jones, Wilmette, Ill., to R. T. Vanderbilt Co., Inc., New York, N. Y.

Patents—Dyestuffs

Production acid ortho-hydroxy azo dyestuffs, capable of being chromed. No. 1,979,061. Karl Zahn and Heinrich Koch, Frankfort-am-Main—Hochst, Germany, to General Aniline Works, Inc., New York, N. Y.

Production water-insoluble azo dyestuffs. No. 1,979,055. Karl Schnitzpahn and Wilhelm Koch, Offenbach-am-Main, Germany, to General Aniline Works, Inc., New York, N. Y.

Process producing complex chromium compounds of ortho-hydroxyazo dyestuffs; treating an azo dye, containing an alkoxy group in ortho position to the azo group, with a sulfate of chromium. No. 1,978,880. Fritz Lange and Hans Krzikalla, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York, N. Y.

Production azo dyestuffs. No. 1,978,783. Miles Augustinus Dahlen, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process manufacture readily soluble basic dyes; phosphoric acid salts of basic dyes. No. 1,978,755. Werner Muller, Cologne-am-Rhine, and Otto Boger, Dessau in Anhalt, Germany, to General Aniline Works, New York, N. Y.

Production vat dyestuffs; oxidation products of mono and dipyridino quinone compounds. No. 1,978,540. Max Albert Kunz, Mannheim, and Gerd Kochendoerfer and Karl Koeberle, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, Inc., New York, N. Y.

Process absorbing a vat dyestuff to the surface of a pale or colorless substratum to produce a pigment; boiling together the vat dye and substratum in a benzenoid hydrocarbon. No. 1,978,197. Anthony James Hailwood, Wm. Johnson Smith Naunton, and Arnold Shepherdson, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Process production naphthoquinone dyes and intermediates. No. 1,977,982. Hans Theodor Bucherer, Munich, Germany.

Production water-insoluble disazo dyestuffs; being yellowish-red to violet shades, practically insoluble in oils and rubber articles. No. 1,977,936. Heinz Eichwede. Frankfort-am-Main-Hochst, Germany, to General Aniline Works, Inc., New York, N. Y.

Production dyestuff paste; comprising a vat dyestuff and the jelly-like, water-soluble reaction product obtainable by circulating ammonia gas over an alcoholic solution of dichlorhydrin at slightly elevated temperature, and treating product with caustic alkali. No. 1,977,272. Ivan Gubelmann, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process for vat dyestuff printing paste, comprising as assistant a water soluble reaction product of epichlorhydrin and a water soluble primary amine. No. 1,977,252. Otto Stallmann, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Preparation printing paste; comprising a vat dyestuff and a water soluble compound, obtainable by reacting epichlorhydrin and ammonia, said compound being free of organic bound chlorine. No. 1,977,250. Otto Stallmann, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process production water-insoluble azo dyestuffs; yielding, when prepared on the fiber generally Turkey red shades of good fastness properties. No. 1,976,187. Wilhelm Neelmeier, Leverkusen, and Wilhelm Lamberz, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York, N. Y.

Process manufacture azo dyes; being generally water-insoluble, blackish-green powders, yielding, when produced on the fibre, generally green shades of good fastness properties. No. 1,976,186. Wilhelm Neelmeier, Sebastian Gassner, and Wilhelm Meiser, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., New York, N. Y.

Process manufacture water-insoluble azo dyestuffs which dye green to olive-green shades of good fastness properties. No. 1,976,185. Carl Josef Muller and Werner Kirst, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York, N. Y.

Method preparing polyazo dye. No. 1,976,044. Francis Hervey Smith, Woodstown, N. J., and Crayton Knox Black, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process preparation water-insoluble azo dye. No. 1,976,010. Miles Augustinus Dahlen, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process preparing a water-insoluble azo dyestuff. No. 1,975,830. Miles Augustinus Dahlen, Wilmington, Del., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Process manufacture azo dye; coupling diazotized 1-naphthylamine-2-sulfonic acid with 1-5 aminonaphthol. No. 1,975,611. Mordecai Mendoza, West Didsbury, England, to Imperial Chemical Industries, London, England.

Process production azo dyes; coupling a diazotized amino compound of the benzene or naphthalene series with a di-alkoxy-aniline. No. 1,975,609. Arthur Howard Knight, Ashton-on-Mersey, England, to Imperial Chemical Industries, Ltd., London, England.

Process manufacture azo dyestuffs; suitable for production on textile fibres, yielding colors of excellent fastness. No. 1,975,465. Wm. Edw. Kemmerich, Nyack, N. Y.

Process production azo dyestuff; for dyeing vegetable and/or animal fibres and/or leather various shades of good fastness to light. No. 1,975,411. Richard Stusser, Cologne-Deutz, Germany, to General Aniline Works, Inc., New York, N. Y.

Process production azo dyestuffs; dyeing animal fibres generally even orange to red shades of good fastness to washing. No. 1,975,402. Wilhelm Neelmeier, Leverkusen-I. G.-Werk, Alfred Carl, Cologne-Rhine, and Hans Hertlein, Leverkusen-Wiesdorf, Germany, to General Aniline Works, Inc., New York, N. Y.

Production azo dyestuffs, obtained by combining molecular quantities, in mineral acid solution, of diazotized 2-4-dinitroaniline and alpha-naphthol sulfonic acids containing 1 to 3 sulfonic acid groups. No. 1,975,340. Henry Wenker, Elizabeth, N. J.

Process making dyestuffs of the anthraquinone-amino-pyranthrone series, dyeing cotton in brown to khaki, olive-green and grey shades. No. 1,975,258. Jos. Deinet, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process producing a pyranthrone-halogen addition compound; by reacting with a halogenating agent upon pyranthrone in the presence of a catalytic proportion of a mild, anhydrous reducing agent. No. 1,975,257. Jos. Deinet, Milwaukee, and David Katz, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process making halogenated pyranthrone, when dry an orange to scarlet powder, yielding upon reaction with alpha-amino-anthraquinone a vat dyestuff dyeing cotton on khaki to olive green shades. No. 1,975,256. Jos. Deinet, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process production indanthrones. No. 1,975,248. Oakley M. Bishop, Wilmington, Del., and Melvin A. Perkins, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process preparation azo dyes. No. 1,975,233. Arthur Howard Knight, Ashton-on-Mersey, England, to Imperial Chemical Industries, Ltd., London, England.

Process preparation azo dyes. No. 1,975,223. Samuel Coffey and Reginald Williams Everatt, Huddersfield, England, to Imperial Chemical Industries, Ltd., London, England.

Preparation azo dyes. No. 1,975,166. Mordecai Mendoza, West Didsbury, and John Hannon, Gorton, England, to Imperial Chemical Industries, Ltd., London, England.

Preparation azo dyes insoluble in alkaline solution. No. 1,975,160. Henry Jordan and Miles Augustinus Dahlen, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Rubber

Two types of materials, liquids and powders, are used for freeing vulcanized rubber from molds after the curing operation. The first class (i.e. soaps and sugar dissolved in water) is generally used where discoloration of the finished goods is not objectionable, or when they are cleaned by washing after vulcanizing. The second (powders) is divided into two classes: pigmenting and non-pigmenting. The former are used where a slight pigmenting effect of the lubricating powder (i.e. talc and starch) is not objectionable. On light colored goods, where it is desired to maintain discoloration at a minimum, powdered lubricants, of the type that either will be absorbed or can be tumbled off after the goods are cured, are used. Examples of the latter type are either a good grade of whiting or pumice.

Patents—Rubber

Method dispersing sulfur chloride directly into a mass of crude solid rubber, heating mass until converted to a soft, sticky plastic. No. 1,978,839. Harold Gray, Akron, O., to B. F. Goodrich Co., New York, N. Y.

Process production rubber compositions of gutta percha or leather-like qualities. No. 1,978,813. Edw. Arthur Murphy, Erdington, Birmingham, England, to Dunlop Rubber Co., Ltd., England.

Process rubber preservation; 2:6 diphenyl-naphthalene-diamine being incorporated in rubber. No. 1,978,444. Ira Williams, Woodstown, and Wm. A. Douglass, Pennsgrove, N. J., and Arthur Morrill Neal, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process effecting dispersion of rubber in an aqueous paste of a hydrophilic colloid, subsequently effecting dispersion of a normally non-fluid bitumen in the rubber dispersion by its use in thick pasty form as dispersing media for the bitumen. No. 1,978,022. Lester Kirschbraun, Leonia, N. J., to The Patent & Licensing Corp., New York, N. Y.

Method incorporating abrasive grains and sulfur with crude plastic rubber; by wetting abrasive and sulfur particles with rubber latex, then milling wet particles into rubber body. No. 1,977,748. Duane E. Webster, Worcester, Mass., to Norton Co., Worcester, Mass.

Preparation latex composition; comprising a blend of an aqueous rubber dispersion, of a latex nature, and a protective-colloid-stabilized aqueous dispersion of a powdered-rubber-compounding agent, of zinc oxide character, carrying a mixture of ditolylamines and petroleum wax. No. 1,977,211. Milton O. Schur, Berlin, N. H., to Brown Co., Berlin, N. H.

Method preparing a spreadable and stable paste from a rubber dispersion or latex; by intermixing a basic salt of one of the three trivalent metals with the rubber dispersion. No. 1,976,394. John Helfrich, Westfield, N. J.

Process recovering rubber from goods having cellulosic materials closely and intimately associated with the rubber portions. No. 1,976,327. Fayette Dudley Chittenden, Nutley, N. J., to Rubber Regenerating Co., Naugatuck, Conn.

Process vulcanizing rubber, by heating rubber and sulfur in the presence of an anti-oxidant comprising a reaction product of an amino substituted triphenyl-methane and an aromatic hydrocarbon. No. 1,975,980. Arthur W. Sloan, Akron, Ohio, to B. F. Goodrich Co., New York, N. Y.

Method rubber preservation; treating rubber with anti-oxidant consisting of a preponderant proportion of a diarylamine, which is activated by admixture with a minor proportion of a diaryl p-phenylene diamine. No. 1,975,734. Waldo L. Semon, Silver Lake Village, Ohio, to B. F. Goodrich Co., New York, N. Y.

Metals and Alloys

Zinc oxide in colloidal form is used in "keenolise" lubricants for producing a hard metallic film on bearing working surfaces, to prevent pitting and corrosion, to lubricate and protect bright parts against corrosion by water and under atmospheric conditions; to reduce wear to a minimum, and to hold the surfaces under high loads. Its presence renders a lubricant anodic to steel, and creates an electrolytic couple which forms an adherent film on the contacting surface. The zinc plates out, producing a hard corrosion-resisting surface. As reported in *The Abrasive Industry*, November, 1934, the film is claimed not to build up beyond an ultra-microscopical thickness.

Patents—Metals, Alloys, Ores

Method treating a copper electrolyte, using titanium. No. 1,979,229. Edgar C. Pitzer, Balto., Md., to American Smelting & Refining Co., New York, N. Y.

Manufacture steel alloy containing carbon and chromium, for reducing brittleness caused by a phosphorus content, balance of alloy being iron. No. 1,979,015. Ernst Hermann Schulz, Dortmund, Germany, to Vereinigte Stahlwerke Aktiengesellschaft, Dusseldorf, Germany.

Process for arc welding flux having composition of hydrated alumina silicate which forms a viscous solution with water; an alkali hydroxide; sodium carbonate; titanium dioxide; feldspar; and water. No. 1,978,318. Virdis Miller, Schenectady, N. Y., to General Electric Co., Schenectady, N. Y.

Method carbonizing ferrous metal; treating surface with nickel nitrate, and exposing treated surface to a carbonizing medium at carbonizing temperature. No. 1,978,180. Paul G. Weiller, Bloomfield, N. J., to Swedish Iron & Steel Corp., New York, N. Y.

Method recovering a lead compound from a lead-bearing ore material. No. 1,977,648. Royal L. Sessions, Denver, Colo., to Hughes-Mitchell Processes, Inc., Denver, Colo.

Method and composition for etching and dampening planographic metal printing plates; composition consisting in aqueous solution an acid phosphate, ammonium nitrate, and nickel nitrate. No. 1,977,646. Geo. S. Rowell, Cleveland, Ohio, to Multigraph Co., Wilmington, Del.

Method and bath for anodic treatment of aluminum or its alloys; bath containing both hexavalent and trivalent chromium and a chromate. No. 1,977,622. Robt. W. Buzzard, Kensington, Md.

Method treating metals, lubricant comprising lead containing tin and phosphorus. No. 1,977,562. Herbert R. Treuting, Newark, N. J., to American Machine & Foundry Co., New York, N. Y.

Method forming an electron emissive surface on a metallic cathode; coating cathode with a mixture of alkaline-earth oxide and sugar; then heating cathode in presence of oxygen to oxidize sugar in coating. No. 1,977,318. Jack McCullough, San Bruno, Cal., to Heintz & Kaufman, Ltd., San Francisco, Cal.

Case-hardening process. No. 1,977,280. Augustus B. Kinzel, Beechhurst, L. I., N. Y., to Electro Metallurgical Co., New York, N. Y.

Process for conditioning ore. No. 1,977,262. Emmett Butler and Arthur K. Knickerbocker, St. Paul, and Richard O. Hocking, Nashwauk, Minn., Francis D. Butler, administrator of said Arthur K. Knickerbocker, deceased.

Process sulphating titaniferous ores. No. 1,977,208. Byramji D. Saklatwalla and Holbert Earl Dunn, Crafton, Pa., and Albert E. Marshall, Scarsdale, N. Y., to Southern Mineral Products Corp., New York, N. Y.

Production corrosion-resisting iron alloy, particularly adapted to resist action of acid media, such as sulfuric, containing following: carbon, manganese, silicon, phosphorus, sulfur, copper, tungsten, and iron. No. 1,977,182. Maurice Palmyre Fould, Paris, France, to Societe Anonyme Des Hauts-Fourneaux, Forges & Acieries De Pompey, Paris, France.

Ore concentrating device. No. 1,976,840. Sherman R. Doner, Philip H. Stevenson, and David M. Tiller, Denver, Colo.

Process for copper alloy, having composition of silicon, tin, iron, balance mostly copper. No. 1,976,803. Wm. B. Price, Waterbury, Conn., to Scovil Mfg. Co., Waterbury, Conn.

Method treating a mixed sulfide ore containing iron and copper. No. 1,976,735. Chas. R. Kuzell, Clarkdale, Ariz.

Production alloy from a beryllium-aluminum ingot or equivalent piece. No. 1,976,375. Jos. Kent Smith, Detroit, Mich., to Beryllium Corp., New York, N. Y.

Process for air-hardening steel; an alloy of about 4.0% copper, 0.16% carbon, and 2.0% manganese, balance being nearly all iron. No. 1,976,341. Herbert Harris, Milwaukee, Wis., to A. O. Smith Corp., Milwaukee, Wis.

Method of removing from lead or lead alloys of antimony, bismuth, or copper, any one or more of the metals in the group containing tin, arsenic, aluminum, silicon, selenium, tellurium, alkali metal, or alkali earth metals. No. 1,976,333. Jos. C. Dittmer, St. Albans, N. Y., to National Lead Co., New York, N. Y.

Manufacture alloy consisting of nickel-cobalt metal, barium, and chromium; the nickel-cobalt metal being 90% or more of the alloy. No. 1,976,295. Donald W. Randolph, Flint, Mich., to General Motors Corp., Detroit, Mich.

Process separation hafnium and zirconium; first step being addition of a soluble ferrocyanide to a solution of hafnium and zirconium salts to form a precipitate of hafnium and zirconium ferrocyanides. No. 1,976,293. Wilhelm Prandtl, Munich, Germany.

Method hardening iron and steel, heating articles to red heat in an atmosphere containing CO, quenching in a bath of linseed oil in which colophony, resin acid potassium and nickel formate have been dissolved, reheating in red heat and quenching in water. No. 1,976,210. Hans Bardt, Berlin, Germany.

Process ore concentration; agitating a pulp of the ore with the reaction product of an acyl chloride and a metal organic monothio-carbonate to yield a floating concentrate, and separating the concentrate. No. 1,976,203. Wm. Trotter, San Francisco, and Eltoft Wray Wilkinson, Berkeley, Cal., to Minerals Separation North American Corp., New York, N. Y.

Process for low specific gravity magnesium-base alloy, containing magnesium and zinc. No. 1,975,376. Georg Schichtel, Dobriach-on-Millstattersee, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Process for low specific gravity magnesium-base alloy, containing magnesium and zinc, and subject to corrosion, being rendered more corrosion-resistant by addition of at least one metal of the antimony and bismuth group. No. 1,975,375. Georg Schichtel, Dobriach on Millstattersee, Austria, to American Magnesium Metals Corp., Pittsburgh, Pa.

Process forming chromium iron alloys. No. 1,975,338. Jos. J. Vetter, Hackensack, N. J., to Natural Products Refining Co., Jersey City, N. J.

Process making ferrous alloys. No. 1,975,310. Gregory J. Comstock, Edgewood, Pa., to Firth-Sterling Steel Co., McKeesport, Pa.

Production black chromium coatings by electrolysis in a chromium electrolytic bath, using a current density of from 10 to 20 times higher values than formerly. No. 1,975,239. Alfred Engelenk Rudolstadt in Thuringen, and Johannes Fischer and Heinz Endrass, Berlin-Charlottenburg, Germany, to Siemens & Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany.

Production copper base alloy for bearing brasses directly adjacent to the axle journal in axle bearings of rail vehicles. No. 1,975,216. Jos. Wecker, Aachen, Germany.

Production magnesium base alloy, containing tin, cobalt, and magnesium. No. 1,975,120. Roy E. Paine, Cleveland, O., to Magnesium Development Corp., Delaware.

Process heat treatment copper-beryllium alloys containing about 0.3 to 12% by weight of beryllium with the remainder copper. No. 1,975,113. Georg Masing, Berlin, and Otto Dahl, Berlin-Charlottenburg, Germany.

Process for beryllium alloy characterized by hardness, strength and resistance to corrosion, containing beryllium, phosphorus, and copper. No. 1,975,112. Georg Masing, Berlin, and Otto Dahl, Berlin-Charlottenburg, Germany, to Metal & Thermit Corp., New York, N. Y.

Composition for treatment molten metals, consisting of equal parts of an alkali metal chlorate, manganese dioxide, a boron compound, calcium fluoride, zinc, manganese, hematite, dolomite, and a carbonaceous substance. No. 1,975,084. Alfred H. Davies, deceased, late of New York, N. Y., to Edith Vail Davies, executrix, New York, N. Y.

Plastics

A new development is a sheet of laminated Bakelite and rubber, the materials being bound together alternately to combine the extreme resiliency of rubber with the strength, rigidity, electrical and solvent-resisting properties of Bakelite. Number and thickness of the layers may be varied to produce a section of any given thickness or characteristic. Possibilities for adaptation are quickly visualized, particularly where quietness and strength are significant in vibration absorbing mountings for motors in electric refrigerators, washing machines, and fans. *The Abrasive Industry*, November, 1934.

Soap

Detergent pellets, characterized by being coherent, easily soluble in water, and capably producing uniform detergent action, are patented under U.S.P. 1,975,946. Product is formed from a mixture of a major part of crystallized sodium metasilicate, a minor part of crystallized tri-sodium phosphate, and enough water to render mixture plastic.

Miscellaneous

Process, given in U.S.P. 1,976,204, recommends spraying water with a volatile liquid refrigerant into a freezing chamber maintained at a pressure such that the refrigerant is completely volatilized, thereby converting all the water into snow. Snow is then collected from the freezing chamber, and compressed into blocks to expel refrigerant vapors.

Transparent Wrapping Material

A new material, made of a transparent self-sustaining sheet comprising a gelatinous base, having a water-proof coating of cellulose nitrate, cellulose acetate and tricresyl phosphate, is given in U.S.P. 1,976,027.

Patents—Miscellaneous Petroleum

Process absorbing ethylene in strong acids. No. 1,979,018. Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Cal.

Process producing liquid partial oxidation products from hydrocarbons. No. 1,978,621. Stephen P. Burke, Elizabeth, N. J., to Doherty Research Co., New York, N. Y.

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Plant at BARBERTON, OHIO

Apparatus adapted for oil cracking process. No. 1,978,593. Edwin F. Nelson, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process vapor phase cracking of high boiling hydrocarbons for production of lower boiling condensible products therefrom. No. 1,978,592. Valentine Mekler, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Treatment hydrocarbon oils. No. 1,978,562. Harry P. Benner, Chicago, Ill., to Universal Oil Products Co., Chicago, Ill.

Process for separating a mixed emulsion; subjecting emulsion to repeated action of magnetism at different frequencies, each of which is adapted for one component of the mixture. No. 1,978,509. Claudius H. M. Roberts, Long Beach, Cal., to Petroleum Rectifying Co. of Cal., Los Angeles, Cal.

Process for treating heavy residues. No. 1,978,361. Gustav A. Beiswenger, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Process for breaking petroleum emulsion of the water-in-oil type; subjecting emulsion to action of an oil-soluble demulsifying agent. No. 1,978,227. Claudius H. M. Roberts, San Marino, Cal., to Tretolite Co., Webster Groves, Mo.

Process converting hydrocarbon oils. No. 1,978,072. Otto Behimer, Port Arthur, Tex., to Texas Co., New York, N. Y.

Process dewaxing oil; treating wax-oil mixtures by mixing methylene chloride with wax-oil mixture, chilling to a temperature below 0°F., and filtering precipitated wax from the mixture. No. 1,978,010. Paul Johnson Carlisle, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process treating motor fuels containing sulfur bearing bodies and non-sulfur bearing, unsaturated hydrocarbons, in which a part of the sulfur bearing bodies are polymerized or dissolved while excessive polymerization of the unsaturated hydrocarbons is prevented. No. 1,977,717. Wm. N. Davis, Oakland, and Wm. H. Hampton, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Process altering mercaptans in gasoline; by addition of elemental sulfur, passing resulting sulfur solution through a mass of brucite. No. 1,977,631. Emerson C. Higgins, Jr., West Los Angeles, Cal., and Franklin T. Gardner, Tulsa, Okla.

Process for breaking a petroleum emulsion of the water-in-oil type. No. 1,977,146. Claudius H. M. Roberts, San Marino, Cal., to Tretolite Co., Webster Groves, Mo.

Process for breaking a petroleum emulsion of the water-in-oil type. No. 1,977,089. Claudius H. M. Roberts, San Marino, Cal., to Tretolite Co., Webster Groves, Mo.

Method stabilizing petroleum oil pressure distillate and recovering desired light components. No. 1,977,087. Paul M. Raigorodsky, Tulsa, Okla., to Petroleum Engineering, Inc., Tulsa, Okla.

Process propane dewaxing. No. 1,977,055. Wm. J. McGill, Alton, Ill., and Chester E. Adams, Hammond, Ind., to Standard Oil Co., Chicago, Ill.

Process for breaking a petroleum emulsion of the water-in-oil type. No. 1,977,048. Melvin de Groote, St. Louis, Mo., and Claudius H. M. Roberts, San Marino, Cal., to Tretolite Co., Webster Groves, Mo.

Process for conversion of organic sulfur compounds to hydrogen sulfide; by contacting organic sulfur compounds with a ferrous sulfide catalyst at a reaction temperature. No. 1,976,806. Raphael Rosen, Cranford and Eugene Lieber, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Process for removal hydrocarbons from separate gas mixtures. No. 1,976,802. Henry Janney Nichols, Jr., to Scotch Plains Township, Union County, and Paul E. Kuhl, Elizabeth, N. J., to Standard Oil Development Co., Bayways, N. J.

Improved process for production of liquid oxidation products containing a substantial amount of alcohol from an aliphatic hydrocarbon. No. 1,976,790. Warren K. Lewis, Newton, and Per K. Frolich, Boston, Mass., to Standard Oil Development Co., Bayways, N. J.

Preparation products containing pectin. No. 1,976,741. Robt. C. Mithoff, Berkeley, Cal., to Standard Oil Co. of Cal., San Francisco, Cal.

Thermal process for conversion of paraffin type normally gaseous materials. No. 1,976,717. Albert Ernst Dunstan, London, and Richard Vernon Wheeler, Sheffield, England, to Gasoline Products Co., Inc., Delaware.

Process for breaking a petroleum emulsion of the water-in-oil type. No. 1,976,602. Melvin De Groote and Wilbur C. Adams, St. Louis, and Bernhard Keiser, Webster Groves, Mo., to Tretolite Co., Webster Groves, Mo.

Method treating gas composed of hydrocarbons of the methane series. No. 1,976,591. Cary R. Wagner, Chicago, Ill., to Pure Oil Co., Chicago, Ill.

Process preparing a lubricating oil, highly resistant to sludge formation, from a mineral oil containing naphthenic and paraffinic hydrocarbons. No. 1,976,544. Sterling H. Diggs and James M. Page, Jr., Casper, Wyo., to Standard Oil Co., Chicago, Ill.

Method separating wax from oil. No. 1,976,535. Harold V. Atwell, Bayside, N. Y., to Standard Oil Co., Chicago, Ill.

Manufacture low boiling distillates from higher boiling hydrocarbon oils. No. 1,976,507. Almer McDuffie McAfee, Port Arthur, Tex., to Gulf Refining Co., Pittsburgh, Pa.

Process and apparatus for converting normally gaseous hydrocarbons to normally liquid hydrocarbons. No. 1,976,469. Malcolm P. Youker, Bartlesville, Okla., to Phillips Petroleum Co., Bartlesville, Okla.

Combined stabilization and absorption process for hydrocarbons. No. 1,976,212. Oswald C. Brewster, Kansas City, Mo., to Gasoline Products Co., Inc., Newark, N. J.

Process for treating a hydrocarbon oil; subjecting oil to action of air and introduced steam at a temperature between 350° and 800°F. but below the temperature of spontaneous combustion in the presence of an adsorbent clay. No. 1,976,177. Arthur Lazar, Associated, Cal., to Associated Oil Co., San Francisco, Cal.

Apparatus for refining hydrocarbons in the vapor phase. No. 1,976,000. Frank A. Apgar, Hammond, Ind., and Kenneth A. Beach, Chester, Pa., to Sinclair Refining Co., New York, N. Y.

Process refining hydrocarbon oil, contacting the oil with an acid while passing the oil in counterflow to the acid in a plurality of contacting stages. No. 1,975,987. Chas. Walcott Stratford, Kansas City, Mo., to Stratford Development Corp., Kansas City, Mo.

Process for breaking petroleum emulsions of the water-in-oil type. No. 1,975,839. Melvin De Groote, St. Louis, Bernhard Keiser, Webster Groves, and Arthur F. Wirtel, Richmond Heights, Mo., to Tretolite Co., Webster Groves, Mo.

Process for motor fuel mixture. No. 1,975,755. Lester F. Hoyt, East Aurora, and Wm. Alvah Smith, Hamburg, N. Y., said Hoyt assignor to said Smith.

Process manufacture lubricating grease; using mixture rubber latex with a metallic salt of a fatty acid, derived from vegetable oils or fats, and a hydrocarbon oil. No. 1,975,582. Edwin N. Klemgard, Martinez, Cal., to Shell Development Co., San Francisco, Cal.

Continuous process of blowing petroleum base materials. No. 1,975,563. Sijbren Tjomstra, University City, Mo., to Shell Development Co., San Francisco, Cal.

Oil cracking process for production of gasoline and other oils from heavy hydrocarbon oils. No. 1,975,549. Ulysses S. Jenkins, Chicago, Ill., to Jenkins Petroleum Process Co., Chicago, Ill.

Process and apparatus for treating hydrocarbon oils. No. 1,975,315. Carbon P. Dubbs, Wilmette, Ill., to Universal Oil Products Co., Chicago, Ill.

Process hydrolyzing acid sludge at high temperatures and superatmospheric pressures. No. 1,975,131. Harry W. Thompson, Richmond, and John T. Rutherford, Berkeley, Cal., to Standard Oil Co., of Cal., San Francisco, Cal.

Chemical Specialties

Process for anti-freeze agent; refrigerating liquid composition of water and a lower mono-alkyl ether of glycerol. No. 1,977,545. Eberhard Elbel, Dusseldorf, Germany, to Henkel & Cie., Gesellschaft mit beschrankter Haftung, Dusseldorf, Germany.

Process making an adhesive; preparing a dry salt of cellulose xanthogenic acid, redissolving salt to glue-spreading consistency in an aqueous solution containing a decomposition product of the sodium salt of xanthogenic acid. No. 1,977,445. Irving Fink Laucks, Seattle, Wash., to I. F. Laucks, Inc., Seattle, Wash.

Preparation insecticide for combating moths, etc., including a highly volatile, non-greasy petroleum base. No. 1,977,412. Ray E. Spokes, Ann Arbor, Mich., to Edgar A. Murray Co., Detroit, Mich.

Preparation adhesive composition, comprising a neutralized vegetable protein-bearing meal and cellulosic viscose containing an excess of alkali. No. 1,977,404. Russell G. Peterson, Tacoma, Wash., to Geo. H. Osgood, Tacoma, Wash.

Method and apparatus for cleaning washing fluids and recovering volatile solvents. No. 1,977,107. Abraham Agronofsky, St. Joseph, Mo.

Method compounding chewing gum base; mixing resin, rubber, and an inhibiting agent soluble in resin but insoluble in rubber, mixing being done at a temperature at which ingredients are plastic but not liquid. No. 1,977,059. Geo. A. Hatherell, Burbank, Cal., to Frank A. Garbutt, Los Angeles, Cal.

Production insecticide and fertilizer compound; a metal lignin sulphonate arsenite. No. 1,976,905. Wm. Thordarson, New York, N. Y.

Production insecticidal composition; being an oil wax gel composed of refined mineral oil and a wax, having a melting point above 90° F., composition being capable of breaking down readily under friction to liberate the insecticidal oil. No. 1,976,780. Dudley H. Grant, Berkeley Heights, N. J., to Stanco, Inc., New York, N. Y.

Process manufacture chewing gum, containing a hard, brittle hydrocarbon resin of petroleum origin (of an odorless and tasteless character); a mixture of cane sugar and glucose, and a flavoring material. No. 1,976,774. Carleton Ellis, Montclair, N. J., to Standard Oil Development Co., Bayways, N. J.

Process manufacture molded detergent pellets; formed from mixture of crystallized sodium metasilicate, crystallized trisodium phosphate, and water. No. 1,975,946. Harry K. Ihrig and Arthur S. Butterworth, Columbus, O.

Process making chewing gum; adding pulverized resinous material including coumarone resin and pulverized hard hydrogenated oil, to uncoagulated latex in such proportions as to form a paste. No. 1,975,447. Franklin V. Canning, New York, N. Y., to Sweets Laboratories, Inc., New York, N. Y.

Process for mothproofing media. No. 1,975,408. Wilhelm Schepss, Leverkusen, near Cologne, and Max Hardtmann, Wiesdorf, Germany, to I. G., Frankfort-am-Main, Germany.

Process for a non-tacky, flexible waterproofing and fire-retarding composition; of chlorinated diphenyl modifying waxes and a metallic soap. No. 1,975,072. Chas. F. Booth, Anniston, Ala., to Swann Research, Inc., Birmingham, Ala.

Tanning, Leather

Improved method of tanning and dyeing skins, using a chromium tanning solution. No. 1,978,545. Matthew M. Merritt, Middleton, Mass., to Tanning Process Co., Boston, Mass.

Process treating skins and hides; subjecting them to preliminary treatment in a bath containing phosphoric acid, with subsequent treatment in an iron tanning bath. No. 1,977,973. Otto Rohm, Darmstadt, Germany.

Process tanning hides and skins; subjecting them to treatment by basic chromium sulfate; using sodium bicarbonate in final tanning step. No. 1,977,226. Kenneth E. Bell, Marblehead, and Milton C. McDonald, Salem, Mass., to A. C. Lawrence Leather Co., Boston, Mass.

Process for unhairing bath containing sulfur in physical combination with a depilatory agent comprising an aliphatic amine. No. 1,976,881. Norman D. Harvey, Jr., Providence, R. I., to Carbide & Carbon Chemicals Corp., New York, N. Y.

Process for tanning hides, skins and pelts; by treatment with a solution containing a retarding compound and a water-soluble compound resulting from the aqueous interaction of equal mols of a urea compound and an aldehyde. No. 1,975,616. Ralph E. Porter, Newark, N. J., to National Oil Products Co., Harrison, N. J.

Method treating leatherboard to liberate natural color of the leather fibre. No. 1,975,556. Herman Wm. Richter, Bridgewater, Mass., to Geo. O. Jenkins Co., Bridgewater, Mass.

Explosives

Process pyrotechnic composition for producing orange smoke; lead peroxide 50 parts, potassium bichromate 35 parts, and magnesium 15 parts. No. 1,975,785. Geo. U. Graff, Washington, D. C.

Process manufacture explosive substance containing ammonium nitrate. No. 1,975,682. Luis Emir d'Asteck Callery, Madrid, Spain, to Nuevos Explosivos Industriales S. A., Madrid, Spain.

Preparation percussion detonating composition; consisting of phosphorus sesquisulfide, gum arabic, magnesium carbonate, calcium carbonate, potassium chlorate, and iron sesquioxide. No. 1,975,679. Andre Blanc, Salaise-sur-Sanne, France.

Process purification TNT; by treatment in molten state with an aqueous solution of an alkaline sulfite in presence of a weakly acidic water-soluble substance, initial hydrogen ion concentration of aqueous solution being above 7.0. No. 1,975,598. Geo. Parker Davies, Stevenston, Scotland, to Imperial Chemical Industries, Ltd., London, England.

Process cast explosive charge; being fused mixture of trinitrophenylethylnitramine, with at least one compound of the group of tetryl and pentaerythritol tetranitrate. No. 1,975,186. Philip G. Wrightsman, Chester, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process for pyrotechnic composition to produce brown smoke; consisting of copper oxide, lead peroxide, and magnesium. No. 1,975,099. Geo. U. Graff, Washington, D. C.

Paper, Pulp, and Cellulose

Process uniformly nitrating cellulose and rapidly removing the mixed nitrating acid therefrom. No. 1,978,962. Milton O. Schur, Berlin, N. H., to Brown Co., Berlin, N. H.

Preparation composition for use in making stencil papers; being a mixture of a cellulose ester, a camphor-bearing oil, glycerine, and a preservative. No. 1,978,836. Leo M. Fink, Seattle, Wash., three-eighths to Ida T. Barnes, and one-eighth to Ralph W. Upton, both of Seattle, Wash.

Process producing a nitrocellulose composition using nitrocellulose and an aliphatic monohydroxy alcohol. No. 1,978,071. Albert Foster York, Washington, D. C., to S. Sternau & Co., Inc., New York, N. Y.

Process producing a nitrocellulose composition, by colloiding highly nitrated nitrocellulose, normally insoluble in ether-acohol by methyl alcohol, with the aid of temperatures below 0°C. No. 1,978,070. Albert Foster York, Washington, D. C., to S. Sternau & Co., Inc., New York, N. Y.

Two-stage process for manufacturing sulfite pulp, which comprises cooking cellulosic material in a digester with a sulfite liquor. No. 1,977,879. Ernst Hochberger, Hawkesbury, Ont., Canada, to Canadian International Paper Co., Montreal, Que., Canada.

Bonding material for addition to fiber water in paper making processes; comprising a finely ground intimate admixture of starch gum, sodium aluminate, and aluminum sulfate; final mixture being a dry, pulverulent powder. No. 1,977,574. Geo. E. Corson, Clinton, Iowa, to Clinton Corn Syrup Refining Co., Clinton, Iowa.

Process paper manufacture; treating pre-fabricated, dried paper containing viscose-derived, regenerated cellulose with substantially anhydrous glycerine containing dissolved chlorine. No. 1,977,221. Jas. A. Yates, Berlin, N. H, to Brown Co., Berlin, N. H.

Process removal solvent from a cellulose ester plastic, containing also a plasticizing agent. No. 1,976,873. Harry P. Bassett, Cynthiana, Ky.

Manufacture paper with alkaline filler, including also coloring matter capable of deterioration by alkaline filler in the presence of moisture at the temperature of paper machine driers. No. 1,976,745. Harold Robt. Rafton, Andover, Mass., to Raffold Process Corp., Massachusetts.

Manufacture sized paper filled with alkaline filler; by mixing fibrous material, alkaline filler, size, and size precipitant, forming a web, and applying sizing affecting agent to web. No. 1,976,744. Harold Robt. Rafton, Andover, Mass., to Raffold Process Corp., Massachusetts.

Manufacture paper containing alkaline filler. No. 1,976,743. Harold Robt. Rafton, Andover, Mass., to Raffold Process Corp., Massachusetts.

Process production films and coatings of cellulosic material. No. 1,976,539. Cyril Wilfred Bonniksen, Slough, England, to Protectoglass Ltd., London, England.

Process manufacture mixed cellulose esters. No. 1,975,897. Max Hagedorn and Paul Moller, Dessau-in-Anhalt, Germany, to I. G., Frankfort-am-Main, Germany.

Process for recovery of pulp from printed paper. No. 1,975,771. Alex B. Davis and James F. Thompson, Cincinnati, Ohio, and Alfred T. Gardner, Appleton, Wis., to Lewis L. Alsted, Appleton, Wis.

Continuous process of drying regenerated cellulose in web form. No. 1,975,708. Ernst Bleibler, Winterthur, Switzerland, to Sylvania Industrial Corp., Fredericksburg, Va.

Process bleaching cellulose. No. 1,975,590. Fred. R. Seavey, Albert J. Phillips, and Fred. Olsen, Dover, N. J., to Cellulose Research Corp., Delaware.

Process treating wood blocks in manufacture of pulp. No. 1,975,255. Lemuel B. Decker, Kenogami, Quebec, Canada.

Process for digestion of vegetable growths to secure cellulose fibre; subjecting growths to action of nitric acid and carbon tetrachloride. No. 1,975,161. Herman B. Kipper, Accord, Mass.

Method curing a cellulose derivative water-insoluble film, by subjecting film to an atmosphere of high relative humidity right after formation of the film and while it still contains a percentage of solvent. No. 1,975,132. Henry E. Van Derhoef, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Glass, Ceramics

Method making porous ceramic body; formed of cordierite and clay, impregnated with a filler. No. 1,978,691. Stuart M. Phelps, Pittsburgh, Pa., to Ceramic Products Co., Pittsburgh, Pa.

Method making ceramic material; by mixing ceramic substances with a colloidal suspension of paraffin in water, removing water to form a moldable composition. No. 1,977,698. Walter J. Scott, Brookfield, Ill., to Western Electric Co., Inc., New York, N. Y.

Process manufacture safety glass; being two sheets of glass and an interposed layer of cellulose ester plastic bonded together with a mixture containing oxy-cellulose acetate. No. 1,976,758. Geo. B. Watkins and Jos. D. Ryan, Toledo, O., to Libbey-Owens-Ford Glass Co., Toledo, O.

Process for laminated safety glass; two sheets of glass and an interposed layer of ethyl cellulose plastic bonded to the glass by ethyl oxy-cellulose. No. 1,976,750. Jos. D. Ryan and Geo. B. Watkins, Toledo, O., to Libbey-Owens-Ford Glass Co., Toledo, O.

Process for safety glass; being two sheets of glass and an interposed layer of cellulose ester plastic bonded together with a mixture containing hydrocellulose acetate. No. 1,976,749. Jos. D. Ryan, Toledo, O., to Libbey-Owens-Ford Glass Co., Toledo, O.

Process for sheet of laminated glass, including two sheets of glass and an interposed sheet of cellulose ester plastic bonded together to provide a composite structure. No. 1,976,748. Jos. D. Ryan and Wm. J. Arner, Toledo, O., to Libbey-Owens-Ford Glass Co., Toledo, O.

Naval Stores

Method separating anethol from pine oil; by subjecting pine oil to action of hydriodic acid, distilling pine oil for the separation of hydrocarbons; finally effecting the separation of anethol from the residue. No. 1,977,064. Irvin W. Humphrey, Wharton, N. J., to Hercules Powder Co., Wilmington, Del.

Water Treatment

Method and apparatus for treating sewage. No. 1,975,109. Wm. C. Laughlin, Kew Gardens, and Abraham B. Asch, Brooklyn, N. Y., to Filtration Equipment Corp., New York, N. Y.

Company Booklets

C292. Bakelite Corp., 247 Park ave., N. Y. City. "Integrity of Finishes" emphasizes particularly these qualities and characteristics of Bakelite Synthetic Resins which impart integrity to a paint product—resistance to sunlight and weathering, moisture resistance, chemical resistance, elasticity and its retention, and toughness. Booklet attempts to apply these factors of integrity to house paints, marine finishes, railway coatings, floor varnishes, furniture varnishes, anti-corrosive primers and finishing coats, and industrial baking finishes. It should be valuable to all persons interested in solving troublesome finishing and maintenance problems.

C293. Commercial Solvents Corp., Terre Haute, Ind. The further on this series goes the more interesting it gets. November issue of *Alcohol Talks* deals with "The Function of Enzymes." This dept. will be only too pleased to see that you receive the booklet regularly each month.

C294. E. I. du Pont de Nemours & Co., Wilmington, Del. An informative book of 76 pages which contains a great deal of data of interest to the textile industry issued by the organic chemicals dept. By way of explanation, it is stated that " 'Brilliant Avirol' is the name used to designate the series of alcohol sulfates and other alcohol derivatives which are particularly suited for the softening and finishing of various materials, such as rayon, cotton, silk, wool, paper and leather." The properties of the several products are described and, in addition, sections of the book are devoted to the processing of cotton and linen, wool, silk and rayon. This is the booklet that the members of the textile industry have been impatiently waiting to arrive. It is, to our knowledge, the first time all of the known data on these interesting higher alcohols have been gathered together. Appearance of the booklet is decidedly an event to the textile industry.

C295. E. I. du Pont de Nemours & Co., Wilmington, Del. Valuable technical information on zinc-mercury plating is available in a new and enlarged edition of the "Operating Manual for Plating with Duozinc," which has just been published by The R. & H. Chemicals Dept. of du Pont. Data given in the manual cover in general all phases of Duozinc plating, including preparing the material for plating, making up the solution, operation, analyzing the solution, testing the deposit, and other details. Several new sections have been included in the new issue. Among the illustrations added are those showing the effect of mercury on the structure of zinc, and Duozinc anode designs. Also, the manual appears in a new and improved form, and is substantially bound.

C296. Fritzsche Brothers, 78 Beekman st., N. Y. City. A new price list of importance to all buyers of aromatic chemicals, essential oils, etc.

C297. The Gardinol Corp., Wilmington, Del. A handy manual which reviews the uses of alcohol sulfates in the textile industry. "Gardinol," it is explained, is a new type of chemical product which is helping the textile industry establish higher standards of quality and production. "It is overcoming the limitations of former processing agents which in turn limited the degree of perfection attainable in processing fibers and fabrics." Booklet outlines the progress that has been made in the use of alcohol sulfates. It describes also the nature and properties of the several types of Gardinol and suggests specific applications. Sections of the booklet discuss the Gardinol series, the properties of the product, the treatment of cotton and linen in all stages of manufacture, and the processing of wool, silk and rayon.

C298. General Plastics, Inc., North Tonawanda, N. Y. *Closure News* for November tells both by description and picture the latest adaptations of Durez molded in closures.

C299. Givaudan-Delawanna, Inc., 80 5th ave., N. Y. City. The October issue of the *Givaudanian* is filled with interesting items. For example: "There's An Insecticide For Every Purpose,"—by the use of an odorless base and a variety of special spray odors, even the most delicate products can be safely sprayed today; a description of Givaudan-Delawanna's new "Corinys" new oriental bouquet. Pages also contain interesting news items. Chemical specialty manufacturers will find this monthly well worth the time it takes to read it through.

C300. Magnus, Mabee & Reynard, 32 Cliff st., N. Y. City. November-December catalog is ready for distribution.

C301. Mallinckrodt Chemical Wks., St. Louis. November price list is available.

C302. Merck & Co., Rahway, N. J. A monthly price list is published and the company will be glad to place additional names on the regular mailing list.

C303. The Neville Co., Pittsburgh. A complete treatise on Neville resins (Paracoumarone-indene) is contained in a brand new booklet. Details are of the wide variety of uses, types and grades of Neville resins, specifications, properties and characteristics are given. It is a real contribution to the literature.

C304. New Jersey Zinc Co., 160 Front st., N. Y. City. "Zinc Pigments" is a new booklet describing in great detail zinc oxide pigments, zinc sulfide pigments, metallic zinc powder.

C305. Nichols Copper Co., 40 Wall st., N. Y. City. "The Use of Copper Sulfate in the Control of Microscopic Organisms," by Frank E. Hale, Ph.D., director of laboratories, Dept. of Water Supply, N. Y. City. This treatise on the control of microscopic organisms which infest water supplies was first published in '25. Since that time it has been called for by water works engineers, health officers, instructors in technical schools, operators of swimming pools and others in all parts of the world. The 3rd edition has been brought up-to-date.

C306. Philadelphia Quartz Co., 121 S. 3rd st., Philadelphia. Latest *P's & Q's* reports on a wide variety of uses for silicates taken from patent literature of many countries. Even to those quite familiar with silicates it will prove a revelation.

C307. Wishnick-Tumpeer, Inc., 251 Front st., N. Y. City. We extend a hearty welcome to the latest house organ "Witcombings." The problem of turning out one that is distinctly different from any existing ones has been admirably solved by Carl Hazard, the editor. The attractive female on page 3, the new cocktail recipes on page 6, the more serious news scattered on every page all combine to fulfill completely "Witcombings" purpose in life, explained editorially on page 2 in the following words, "Through it we hope to amuse, instruct and stimulate." CHEMICAL INDUSTRIES, through this dept., will be glad to arrange for its readers to receive "Witcombings" regularly.

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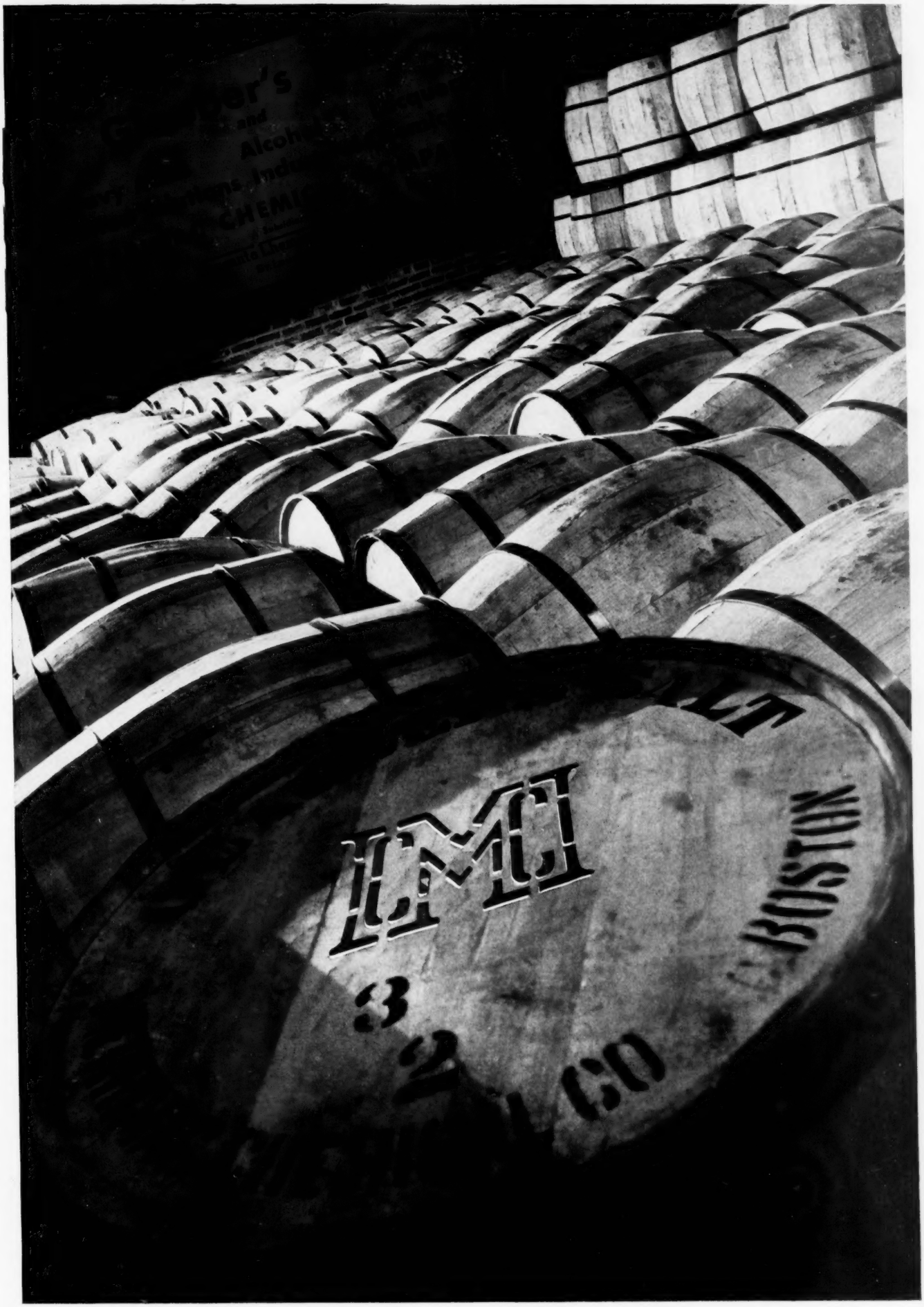
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Chemical Production

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Economics of Technological Progress

IN a contribution to the discussion on "The Need for a Technique of Economic Change" arranged by the Department of Industrial Co-operation of Section F (Economic Science and Statistics) at the Aberdeen meeting of the British Association, Mr. N. F. Hall examined the more specifically economic problems which arise as a consequence of technological improvements. Economics, like other sciences, he pointed out, has in the past made progress by adopting the well-tried method of limiting the number of variables in any problem under review. The necessity for the limitation of variables has resulted in the development of the idea of the 'Stationary State', which has been the most fruitful abstraction for purposes of economic analysis. As soon, however, as one or more of our hypothetical constants becomes a variable, the stimulus of a change in population or increasing technological knowledge alters our simple stationary State into a dynamic system.

The technique of economic change is therefore the accurate interpretation of changes in relative prices under dynamic conditions. Among such changes are those associated with developments in scientific knowledge, which make possible new methods of production and lead either to the output of entirely new goods or to the better fabrication of old ones, or to both things concurrently. This sort of technological change gives rise to numerous economic disturbances, such as the problem of obsolescence or the territorial regrouping of industries. Limiting the subject, however, for the present purpose to the economic difficulties which arise in securing the orderly development of the new processes rather than in the decent burial of the old, we are confronted with a special case of the general problem of uncertainty. The economist has learned in the last decade to distinguish between those incidents in economic life which are called risks and those which he now defines as "uncertainties". A risk such as that of shipwreck or fire is a recurrent circumstance and consequently capable of quantitative measurement and actuarial treatment. Uncertainties, however, are unpredictable and incapable of quantitative measurement; they arise out of the freedom of the mind and the continual possibility of change in human tastes and human knowledge. They reflect in brief the difference between hypothetical stationary State of simpler economic theory and the real world.

The necessity for specialization introduces the element of "true" uncertainty and a specialized economy can only be, in a very limited sense, a competitive one. The greater the degree of specialization, the larger will be the zone of uncertainty, as the obstacles in the way of adjustment and re-adjustment will increase as specialization continues. Here then is the economic problem which is created by every forward step in scientific and in technological knowledge. The utilization of advancing knowledge in the service of society demands an ever-increasing specialization both of the men and of the capital goods with which they co-operate. The more both plant and labor are specialized, the greater the difficulties of bringing about further changes, particularly when these changes are on so large a scale that they require a more extensive re-distribution of both men and plant than can be secured by a wise direction of new entrants into industry or by far-seeing investment of new savings. The need for a technique of economic change arises because the benefit of further developments in scientific knowledge would be lost unless in the economic sphere the rigidity which specialization necessarily brings with it can be overcome.

In the past, neglect of the price problems set up by uncertainty in connexion with the task of introducing new plant and new processes has been a cause of many difficulties. The inherent tendency in free as in "planned" economic systems to overdevelop the new thing seems in large part to arise from a misunderstanding of the way in which these zones of uncertainty, arising out of technological change, influence the price system, so that the economic danger signals given by the price changes are either disregarded or entirely ignored. Confusion arises because changes in the prices of, and the economic return upon, new fixed plant—which are the result of changes in the element of uncertainty—are mistakenly considered to represent a permanent shift in the nature of the demand for the particular plant and its products.

Nearly all proposals for monetary manipulation seem to be open to the fatal objection that they are built upon the assumption that there is little or no change in technological processes and that uncertainty is absent. The result is that they cannot be made to apply to "real" conditions. Proposals for arbitrary alterations in the supply of legal tender money will also fail to achieve the objectives of stabilizing the price level or of providing a quantity of purchasing power "sufficient to carry off the whole potential product of modern industrial plant", because this stream of purchasing power—however it might be injected into the system—has an influence upon the general price level and upon the volume of economic activities, which varies with the degree of uncertainty present. It is necessary rather to look to improvements in the methods employed in financing new processes as the first practical step in the development of a technique of economic change.

Changes in uncertainty lead to extensive variations in capital values and in the prices of capital goods. The objective must be to isolate the economic effects of these price shifts to prevent them causing either over-investment in new processes or general Stock Exchange disturbances. Existing financial institutions in their own interest might agree that they would not themselves finance directly the development of any new process but would pool a limited quantity of their resources to form a special holding company, which would itself finance the necessary number of unit companies to try out a new process or processes. The knowledge that such a pool existed should deter the private investor from walking into a field which is already undergoing professional development, and the Stock Exchange might be prevailed upon not to give facilities to competing new issues. Financial interests would lose some of their spectacular profits, but their business would become more stabilized and less subject to violent fluctuation than in the past. Once the method had been fairly tried and tested, there would soon be felt a need for closer co-operation between financial interests and technological research, as well as for a centralization of part of the economic intelligence services of finance. *Nature* (British), Oct. 13, p579.

Heavy Chemicals

Chemical Age digests report on the production of acetaldehyde by the process of the Consortium für Elektrochemische Industries (oxidation of acetylene in the presence of mercuric oxide catalyst) as given in *Chemiker-Zeitung* by Dr. H. Thommen. A compressor sucks the acetylene (freed from phosphine and sulfuretted hydrogen) from a gasholder into the reaction chamber filled with 30% sulfuric acid and fitted with a stirrer. Simultaneously a suspension of mercuric oxide in water continuously streams into the chamber. Temperature of the acid rises to 60 to 70° C. in the course of stirring and at this temperature a good yield of acetylene is formed and carried away with water vapor in the gaseous stream. Part of the acetaldehyde is condensed in a cooler and a part is absorbed in a washing tower. From the aqueous solution pure acetaldehyde is isolated by distillation. Remaining gaseous mixture is returned to the reaction chamber where more acetaldehyde is absorbed and the cycle is repeated.

A Lithopone with Increased "Fastness"

A foreign process for simultaneously increasing the fastness to light of lithopone and reducing the "feeding," is described in U. S. Patent No. 1,975,716 and consists in treating calcined lithopone with an amount of phosphoric acid insufficient to dissolve oxide of zinc contained in the lithopone but sufficient to combine with the major portion of the oxide of zinc in the form of insoluble zinc phosphate in order to obtain a lithopone neutral to phenolphthalein, product thus obtained being thereupon filter-pressed and dried.

Removing Impurities In Phosphate Rock

Method of removing impurities in the process of converting phosphate rock into calcium nitrate and a solution containing free phosphoric acid, consists of crystallizing calcium nitrate by cooling the reaction product of phosphate rock and nitric acid of some 45-65%, separating the calcium nitrate crystals together with coarse undissolved impurities from the mother liquor and the fine impurities suspended therein, adding neutralizing substances to the mother liquor and subjecting it to filtration to remove the impurities suspended therein. U. S. Patent 1,976,283.

Reducing Toxic Effect of Carbon Monoxide

K. Winzer points out in the Oct. 3 issue of *Chemiker-Zeitung* that elimination of carbon monoxide from illuminating gas with a view to reducing the toxic action is best by low temperature cooling. He rejects, for different reasons, such methods as absorption by cuprous chloride, combination with caustic potash with formation of sodium formate, and catalytic reduction to methane. Biological method of carbon monoxide elimination is impracticable at present owing to the slowness of the reaction.

High Molecular Alkyl Chlorides

Dr. W. Schrauth, in the Oct. 31 issue of the *Chemiker-Zeitung*, reviews method of manufacture of high molecular alkyl chlorides on an industrial scale. They are produced from higher fatty alcohols by reaction with hydrochloric acid. For example; the mixture of alcohols obtained by catalytic reduction of coconut oil is convertible into a chloride with a chlorine content of 15.2%, a flash point of about 170° C., a freezing point of about — 12° C. and a specific gravity of .086. In general, the higher alkyl chlorides are readily soluble in common organic solvents, while they themselves exercise a powerful solvent action upon fats, oils, waxes, bitumen, etc. They appear to be free from marked toxic effects.

Epsom Salt Manufacture

In the preparation of Epsom salts from a magnesium hydroxide sludge, the method of converting the hydroxide to the sulfate in solution comprises initially the forming of a pumpable suspension of a portion of the sludge, continuously circulating a stream of the suspension from a vessel through mixing means and back to the vessel, introducing sulfuric acid to the circulating stream continuously and in relatively small proportion to prevent excessively violent reaction therebetween, introducing additional relatively dry sludge to the solution in the vessel and continuing the circulation in the presence of acid to form without evaporation a substantially saturated Epsom salt solution (U. S. No. 1,977,560).

Acetic From Acetaldehyde

Recently patented process for manufacturing acetic (U. S. No. 1,976,756) from acetaldehyde consists in passing a gas containing acetaldehyde and oxygen in contact with a catalyst solution of cobalt acetate in acetic acid while the temperature is held at such a point as to oxidize the acetaldehyde to acetic, the acetic acid vapors being separated from the catalyst solution.

Production of Guanidine Salts

Guanidine salts can be produced with calcium cyanamid as a starting point. Mixed with ammonium nitrate the cyanamid is heated on a water bath for 2 hours, reaction mixture being then extracted with water and the guanidine separated from calcium nitrate by fractional crystallization. H. Gockel, Angew. Chem., '34, p555.

Improvement In Diphenyl Process

A patented improvement in the process of producing diphenyl consists in maintaining in the benzene a sulfur content in excess of 0.10% before the benzene enters the pyrolyzing zone (U. S. No. 1,978,069).

Patents—Industrial Chemicals—Apparatus

Method recovering SO_2 used in refining mineral oils. No. 1,979,232. Ignaz Rosenberg, Berlin, Germany, to Edeleanu Gesellschaft m.b.H., Berlin, Germany.

Method scrubbing gas to remove fume particles. No. 1,979,189. Dana W. Bowers, Phila., Pa.

Catalyzer comprising a non-combustible catalyst carrier and a catalytic material, in divided form, attached thereto; by applying a silicon ester, then the divided catalytic material to the ester, while the ester is still tacky. No. 1,979,187. Wm. Thos. Robinson Bindley, London, England, to Robinson Bindley Processes, Ltd., Mitchom, England.

Process treating N-benzyl-para-aminophenol, with sulfuric acid, and separating the N-benzyl-para-aminophenol sulfate. No. 1,979,154. Chester W. Hannum, Chicago, Ill., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process manufacturing an alkali metal hydroxide. No. 1,979,151. Hermann Fricke and August Meier, Munich, Germany, to Alterum-Kredit-Aktien-Gesellschaft, Berlin, Germany.

Process producing polynaphthyl ethers; heating together, in presence of sulfuric acid, a naphthol and a compound, selected from the aliphatic glycols and polyhydroxy aliphatic ether-alcohols group. No. 1,979,145. Milese A. Dahlen and Cryaton K. Black, Wilmington, Del., and Wm. L. Foohey, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process producing poly-naphthol ethers. No. 1,979,144. Miles A. Dahlen and Crayton K. Black, Wilmington, Del., and Wm. L. Foohey, Pennsgrove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process manufacturing alkali metal carbonate ammonium chloride, alkali metal nitrate and hydrochloric acid. No. 1,979,137. Friedrich Bartling, Huglfing, Germany; Jenny Bartling, Huglfing, executrix of said Friedrich Bartling, deceased, to Alterum Kredit-Aktien-Gesellschaft, Berlin, Germany.

Process manufacture of n-sulfoethyl compounds of arylamino-sulfonic acids. No. 1,979,033. Hans Grotowsky and Wilhelm Muhl, Crefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Manufacture sterile modeling clay; having incorporated in it a solid monohydric phenol. No. 1,979,016. Lee W. Sexton, Easton, Pa., to Binney & Smith Co., New York, N. Y.

Method reclaiming abrasive and refractory grains from the aluminum silicate bond with which they are bonded. No. 1,978,884. Dell Mack Ramsey, Hamburg, N. Y., to Exolon Co., Blasdell, N. Y.

Manufacture refined gutta percha, balata, and the like. No. 1,978,869. Willoughby Statham Smith, Benchans, Newton Poppleford, Henry Jos. Garnett, Lymne, Solefields, Sevenoaks, and John Norman Dean, Orpington, England.

Process recovering volatile values from liquid and originally solid hydrocarbon sources. No. 1,978,984. Russell Carter, Washington, D. C.

Method preparing carotene pigment material. No. 1,978,981. Harold M. Barnett, Cleveland, O., to S. M. A. Corp., Cleveland, O.

Process preparing an alkali metal perborate; evaporating to dryness an aqueous solution containing borax and hydrogen peroxide. No. 1,978,953. Jas. McKeown, Woodbridge, N. J., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Process for production of 4′, 4 dihydroxy B, B, diphenyl propane; by reacting phenol, acetone, and an acid condensation agent in presence of an inert diluent. No. 1,978,949. Siegfried Kohn and Edw. Schub, Phila., Pa., to Rohm & Haas Co., Inc., Phila., Pa.

Preparation care binding composition, including a vehicle having binding properties, carrying a resin in suspension. No. 1,978,948. Geo. F. Kennedy, Wilmington, Del., and Jos. N. Borglin, Kenvil, N. J., to Hercules Powder Co., Wilmington, Del.

Catalytic process for production of ketones from gas mixtures, containing as a major component, vapors of alcohols. No. 1,978,824. Lloyd C. Swallen, Terre Haute, Ind., to Commercial Solvents Corp., Terre Haute, Ind.

Process producing alumina poor in silica acid from alkaline earth aluminates by extracting the same with alkali carbonate solutions, and fixing the silicic acid with lime, followed by the precipitation of alumina. No. 1,978,823. Josef Stohr, Waldshut, Germany.

Manufacture leuco indigo by a continuous process; simultaneously passing, under pressure, hydrogen and an alkaline suspension of indigo through a pervious body of rigid character, body including a nickel catalyst containing alumina. No. 1,978,820. Kenneth Herbert Saunders, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., Westminster, England.

Process for recovering alkali metal nitrates. No. 1,978,751. Paul Kubelka, Prague, Czechoslovakia, and Wilhelm Schneider, Karlsruhe, Germany.

Method improving dispersion properties of lithopone to secure improved leveling in paint; by adding small amount of salicylic acid to calcined lithopone in finishing stage of manufacture. No. 1,978,727. Geo. F. A. Stutz and Adolf C. Elm, Palmerton, Pa., to New Jersey Zinc Co., New York, N. Y.

Method producing a plasticizer; composition of an organic plastic substance and an ester of benzoyl acrylic acid with a monohydric alcohol. No. 1,978,710. Alphons O. Jaeger, Mt. Lebanon, Pa., to American Cyanamid & Chemical Corp., New York, N. Y.

Method making sodium salts; mixing caustic soda and an aliphatic alcohol to form a liquid, adding anhydrous acetone, and separating precipitated sodium salt from the liquid. No. 1,978,647. Edgar T. Olson, New York, N. Y., and Ralph H. Twining, Marquette, Mich., to Cleveland-Cliffs Iron Co., Cleveland, O.

Method softening boiler feed water; by adding successively alkaline reacting boiler water and alkali metal phosphate to the water under treatment, while flowing rapidly through a closed and unheated pipe system. No. 1,978,629. Guido Hedrich, Budenheim, Germany, to Chemische Fabrik Budenheim Aktiengesellschaft, Mainz, Germany.

Process whereby ethyl alcohol is transformed primarily into acetone by the action of essentially heavy metal oxide catalysts. No. 1,978,619. Grover Bloomfield, Elkhorn, Wis., and Lloyd C. Swallen and Francis M. Crawford, Terre Haute, Ind., to Commercial Solvents Corp., Terre Haute, Ind.

Production synthetic resin; being reaction product of alpha-terpinene, maleic anhydride, and abietic acid. No. 1,978,598. Ernest G. Peterson, Wilmington, Del., to Hercules Powder Co., Wilmington, Del.

Method manufacturing hydrogen peroxide; first step being treatment barium peroxide with dilute mineral acid. No. 1,978,551. Mahlon J. Rentschler, Willoughby, O., one-half to Wm. R. Jeavons, Cleveland Heights, O.

Process removing a metal from a mixture thereof, with one or more metals lower in the electro-motive force series; by treating molten mixture or alloy with moistened barium peroxide. No. 1,978,537. Wm. R. Jeavons, Cleveland Heights, and Mahlon J. Rentschler, Willoughby, O.

Process for basic alcohol. No. 1,978,539. Jos. Klarer, Fritz Mietzsch, and Hans Hahl, Elberfeld, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Process preparing molded product. No. 1,978,533. Harold S. Holt, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process repurifying carbon dioxide gas. No. 1,978,508. Gustave T. Reich, Phila., Pa.

Process for preparation, separation, and purification of salts, salt and other solutions. No. 1,978,447. Geza Austerweil and Chas. Jeanprost, Paris, France.

Method producing nitrites, in which gases containing oxides of nitrogen are absorbed in a suitable solution of suspension of the desired alkali base. No. 1,978,431. Wm. E. Kirst, Woodbury, N. J., and Fred. J. G. Thedieck, Richmond, Va., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method of producing ketones. No. 1,978,404. Grover Bloomfield, Lloyd C. Swallen and Francis M. Crawford, Terre Haute, Ind., to Commercial Solvents Corp., Terre Haute, Ind.

Process of separating calcium and magnesium chlorides. No. 1,978,403. Edwin O. Barstow, Sheldon B. Heath, and Forest R. Minger, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Production ethyl alcohol; directly combining ethylene with water vapor at elevated temperature in the presence of a catalyst of phosphoric acid and ferrous iron. No. 1,978,267. Walter Philip Joshua, London, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Cheam, England, to Distillers Co., Ltd., Edinburgh, Scotland.

Method producing ethyl alcohol; combining ethylene with water vapor in the presence of a solid catalytic body. No. 1,978,266. Walter Philip Joshua, London, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Cheam, England, to Distillers Co., Ltd., Edinburgh, Scotland.

Method producing ethyl alcohol; combining ethylene with water vapor in the presence of a catalyst of phosphoric acid and a copper-containing substance. No. 1,978,269. Walter Philip Joshua, London, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Cheam, England, to Distillers Co., Ltd., Edinburgh, Scotland.

Method production ethyl alcohol. No. 1,978,270. Walter Philip Joshua, London, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Cheam, England, to Distillers Co., Ltd., Edinburgh, Scotland.

Manufacture ethyl alcohol; directly combining ethylene with water vapor at elevated temperature in the presence of a catalyst compounded from phosphoric acid and cobaltous cobalt. No. 1,978,268. Walter Philip Joshua, London, Herbert Muggleton Stanley, Tadworth, and John Blair Dymock, Cheam, England, to Distillers Co., Ltd., Edinburgh, Scotland.

Process making titanium dioxide; heating a dilute water solution containing titanium sulfate and from 6 to 14% free sulfuric acid, to cause precipitation of basic titanic sulfate. No. 1,978,228. Byramji D. Saklatwalla and Holbert Earl Dunn, Crafton, Pa., and Albert E. Marshall, Scarsdale, N. Y., to Southern Mineral Products Corp., New York, N. Y.

Process and catalyst for oxidizing ammonia; passing a mixture of ammonia and an oxygen, containing gas, in contact with a catalyst of an alloy of platinum and a metal taken from the combined 5th and 6th groups of the Periodic System. No. 1,978,198. Stanley L. Handforth, Woodbury, N. J., one-half to E. I. duPont de Nemours & Co., Wilmington, Del., and one-half to Baker & Co., Inc., Newark, N. J.

Process producing litharge containing enough lead ant moniate to make it highly efficient in "doctor solution"; material containing lead sulfate, metallic lead and antimony with sodium carbonate. No. 1,977,993. Morris P. Kirk, Los Angeles, Cal., to Morris P. Kirk & Sons, Inc., Los Angeles, Cal.

Process for recovery of hydrogen from gases containing hydrogen and hydrocarbons. No. 1,977,992. Ernst Hochschwender and Max Josenhaus, Leuna, Germany, to Standard-I. G. Co., Linden, N. J.

Process recovery of pure fatty acids from the acid products of the destructive oxidation, with gaseous oxidizing agents, of difficulty volatile, non-aromatic hydrocarbons. No. 1,977,988. Hanz Franzen, Mannheim, and Guenther Kunze, Oppau, Germany.

Production resinous condensation products, by heating aralkyl halides with aromatic compounds free from sulfonic groups. No. 1,977,979. Carl Winter and Nikolaus Roh, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process for removal of CO from gases used for synthesis of ammonia; contacting gases in presence of oxygen with a catalyst of a manganite of a heavy metal. No. 1,977,978. Wilhelm Wenzel, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Method for production gramophone records; by molding resinous plastics and fillers. No. 1,977,940. Fritz Frank, Berlin, Germany, to firms Hanseatische Muhlenwerke Aktiengesellschaft, Hamburg, Germany, and Polyphonwerke Aktiengesellschaft, Berlin, Germany.

Process for separating hydrogen chloride from a solution of the same in water by treatment of the solution with an absorbent of heated, concentrated calcium chloride. No. 1,977,923. Hugo Specht, Mannheim, Germany, to Holzhydrolyse Aktiengesellschaft, Heidelberg, Germany.

Production molded article containing an insert; molded from a phenol-formaldehyde composition, a covering of a phenol-fatty oil reaction resinoid composition in contact with the insert. No. 1,977,876. Frazier Groff, Verona, N. J., to Bakelite Corp., New York, N. Y.

Process for making acetaldehyde, and a dehydrogenating catalyst, consisting of reduced copper, with chromium in the form of oxide, supported on an inert carrier. No. 1,977,750. Chas. O. Young, deceased, late of Charleston, W. Va., by Marion K. Young, executrix, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York, N. Y.

Process for using spent sulfite liquor; precipitating from solution the ligneous and resinous constituents of the spent liquor; treating precipitate to eliminate all free moisture, then molding same. No 1,977,728. Ralph W. E. Leach, Winchester, Mass.

Process for synthesis of oxygenated organic compounds by the reduction of carbon monoxide, characterized by the use of a phosphate of a metal of Groups 1-2 of the Periodic System as catalyst. No. 1,977,718. Henry Dreyfus, London, England.

Process producing water gas. No. 1,977,684. Chas. E. Lucke, New York, N. Y., to Babcock & Wilcox Co., Bayonne, N. J.

Transfer process and transfer marking composition; composition containing a phenol-formaldehyde condensation resin which has been condensed in the presence of an additional resin. No. 1,977,680. Winthrop Stanley Lawrence, New York, N. Y., to Kaumagraph Co., New York, N. Y.

Process production white, fluffy, inodorous, tasteless, neutral, water-insoluble acetic acid ester of Musa cellulose, having greater strength in the deposited condition after having once been placed in solution than similarly prepared wood cellulose and/or acetated cotton cellulose deposited from a solvent. No. 1,977,664. Edw. Chauncey Worden, 1st, Millburn, N. J., to Hanson & Orth, New York, N. Y.

Process separation of ethylene from its homologues; first step comprising washing a gas mixture containing substantial amounts of ethylene and higher gaseous olefines with an ammoniacal cuprous salt solution. No. 1,977,659. Harold Garfit Watts, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Process for catalytic hydration of olefines; whereby a strontium phosphate catalyst is used. No. 1,977,635. Geo. Frederick Horsley, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Production alcohols from olefines; process comprises reacting an olefine and water in presence of a boron phosphate catalyst. No. 1,977,634. Geo. Frederick Horsley, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Process preparing alcohols; by reacting an olefine and water in the presence of a hydrating catalyst taken from the phosphates, beryllium, cadmium or zinc group. No. 1,977,633. Geo. Frederick Horsley, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Process production ethyl alcohol by the catalytic hydration of ethylene. No. 1,977,632. Geo. Frederick Horsley, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Process production diphenylolpropane; reacting phenol and acetone in presence of sulfuric acid having a strength of 65-75% by weight. No. 1,977,627. Richard Greenhalgh, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., London, England.

Method producing zinc sulfide pigments; combining a zinc compound with a solution of a sulfide to form a slurry comprising a zinc sulfide. No. 1,977,583. Marion L. Hanahan, East Orange, N. J., to Krebs Pigment & Color Corp., Wilmington, Del.

Preparation Epsom salts from a magnesium hydroxide sludge. No. 1,977,560. Otto V. Martin, Tulsa, Okla., to Texaco Salt Products Co., New York, N. Y.

Process for emulsifying medium; mixing casein, swollen by an alkali, with a resin or fatty acid soap, stirring to highest degree of viscosity, then allowing mixture to stand, in order to ripen. No. 1,977,558. Rudolf Kern, Oschatz, Germany, to Chemische Fabrik R. Baumheier Aktiengesellschaft, Zschollau, near Oschatz, Germany.

Method for separating inosinic acid from adenosine phosphoric acid; by converting a mixture of these acids into a mixture of their earth alkali metal salts, separating these salts of the acids by fractional crystallization. No. 1,977,525. Pawel Edw. Ostern, Lwow, Poland, to Chemische und Pharmazeutische Fabrik Dr. Georg Henning, Berlin-Tempelhof, Germany.

Process making lead sulfocyanide; treating an alkali metal sulfocyanide solution containing ferrocyanides with a compound of a metal whose ferrocyanide is substantially insoluble. No. 1,977,440. Chas. Roberts Harris, Niagara Falls. N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Improved method production sodium carbonate decahydrate; precipitating said product and ammonium chloride from an aqueous eutectic solution of the same by the addition of sodium chloride, ammonia and CO_2 at a temperature of not more than 15°C. No. 1,977,376. Geo. Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York, N. Y.

Production wood stain; consisting of a water-soluble dye, ethyl ether of diethylene glycol, alcohol, and methyl ether of ethylene glycol, all by weight. No. 1,977,345. Chas. G. Moore, Lakewood, and Milton Zucker, Cleveland, O., to Glidden Co., Cleveland, O.

Process for preparation of thiourea; the introduction of hydrogen sulfide into an aqueous solution of calcium cyanamide in the presence of CO_2. No. 1,977,210. Wilhelm Schulenburg, Frankfort-am-Main, Germany, to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production 1, 3, 5-trimethyl benzene by catalytic dehydration of acetone, using an alumina hydrate of natural origin as catalyst. No. 1,977,178. Hans Dohse, Heidelberg, and Curt Schuster, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Apparatus for carrying out chemical reactions between gas-like substances. No. 1,977,155. Robt. Stadler, Ziegelhausen-am-Neckar, and Otto Eisenhut, Heidelberg, Germany, to I. G., Frankfort-am-Main, Germany.

Process production dry CO_2; treating a mixture of magnesium carbonate and silica under superatmospheric pressure with steam to produce a mixture of CO_2 and steam. No. 1,977,063. Raymond Thayer Howes, Long Beach, Cal., to Hewlings Mumper and Lewis Cruickshank, Los Angeles, Cal.

Production nickel salts of mononuclear keto aromatic acids having formula $(R\text{-}CO\text{-}R'COO)_2Ni$, in which R is a mononuclear aromatic group and R' is aliphatic. No. 1,977,047. Lloyd C. Daniels, Crafton, and Alphons O. Jaeger, Mt. Lebanon, Pa., to American Cyanamid & Chemical Corp., New York, N. Y.

Apparatus for determination of carbon dioxide. No. 1,977,002. Gustaf Ljunggren, Lund, Sweden.

Process for increasing wetting-out power of alkaline lyes; mixing lyes with mixtures of phenols and diethylaminoethyloleylamide. No. 1,976,886. Heinrich Lier, Basel, Switzerland, to Chemical Works, formerly Sandoz, Basel, Switzerland.

Process making a hard, dried gel; by treating a hydrous oxide precipitate with an organic acid to form a peptized mass, and nearly dehydrating said mass. No. 1,976,875. Gerald C. Connolly and Jeremiah A. Pierce, Balto., Md., to Chester F. Hockley, receiver for The Silica Gel Corp., Balto., Md.

Method preparing compound for meat treatment; forming mixture of nitrite and a nitrate, selected from the sodium and potassium group; melting, then suddenly cooling mixture without substantial crystallization. No. 1,976,831. Chas. Everett Breizy, Pittsfield, Mass.

Process for rubber bonded abrasive article; mixing a dispersion of previously coagulated rubber with abrasive grains and sulfur, drying mixture to such a degree that it becomes disintegrable without substantial separation of grain from the rubber; finally disintegrating dried mixture. No. 1,976,798. Chas. S. Nelson, Niagara Falls, N. Y., and Garnet H. Porter, Pittsfield, Mass., to The Carborundum Co., Niagara Falls, N. Y.

Solid carbon dioxide machine. No. 1,976,777. Justus C. Goosmann, Mt. Vernon, N. Y., to Adico Development Corp.

Method manufacturing cobaltic acetate; by contacting oxygen and acetaldehyde with a solution of cobaltous acetate in acetic acid, afterwards removing the solvent. No. 1,976,757. Walter O. Walker and Ulrich Kopsch, Milwaukee, Wis., to A. O. Smith Corp., Milwaukee, Wis.

Method manufacturing acetic acid from acetaldehyde; by passing a gas containing acetaldehyde and oxygen in contact with a catalyst solution of cobalt acetate in acetic acid. No. 1,976,756. Walter O. Walker and Ulrich Kopsch, Milwaukee, Wis., to A. O. Smith Corp., Milwaukee, Wis.

Method recovery sulfur from sulfide ores. No. 1,976,736. Chas. R. Kuzell, Clarksdale, Ariz.

Process oxidizing aldose sugars; comprising electrolytic oxidation of an aldose sugar in presence of a halogen salt of higher atomic weight than chlorine. No. 1,976,731. Horace S. Isbell, Washington, D. C., to the Government of the United States, represented by the Secretary of Commerce.

Production liquid lubricant, consisting of di-butyl phthalate, to which a small amount of nitrocellulose has been added, sufficient to adjust the viscosity to any desired value suitable for lubrication. No. 1,976,716. Warren A. Custer, Orange, N. J.

Method purification gas containing nitrogen oxide and oxygen from nitrogen oxide, by contact with a porous, moist, metallic sulfide contact mass of high alkalinity. No. 1,976,704. Alger L. Ward, Drexel Hill, and Claude W. Jordan, Paoli, Pa., to United Gas Improvement Co., Phila., Pa.

Process production electrolyte for electrolytic condensers, consisting of an aqueous solution of pure boric acid. No. 1,976,700. Julius Edgar Lilienfeld, Winchester, Mass., to Ergon Research Laboratories, Inc., Malden, Mass.

Process for production tetrahydroindanthrone tetrasulfuric acid esters. No. 1,976,689. David Alexander Whyte Fairweather and John Thomas, Grangemouth, Scotland, to Scottish Dyes, Ltd., Grangemouth, Scotland.

Container for liquified gases. No. 1,976,688. Leo I. Dana and Geo. H. Zenner, Buffalo, N. Y., to Linde Air Products Co., New York, N. Y.

Production addition compounds of formyl halides. No. 1,976,682. Heinrich Hopff, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Production dispersions; suitable for improving fibrous organic materials, consisting of a water-soluble, amorphous, polymeric acrylic acid substance, and a water-insoluble coloring material. No. 1,976,679. Hans Fikentscher, Hanns Wappes, Ludwig Eifflaender, Conrad Schoeller, and Alwin Schneevoigt, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process production of polymerization products of a higher stage of polymerization than dioxane. No. 1,976,678. Max Wittwer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Process production alkylene derivatives from alkylene oxides, by reacting with the latter on hydroxyl bearing compounds. No. 1,976,677. Max Wittwer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Method preventing smoke in a stack from reaching the atmosphere. No. 1,976,629. Edward Parkinson, Phila., Pa.

Combination carbide and water container. No. 1,976,622. Gould C. McIntyre, Hopewell, Va.

Process for treating acid liquor rich in organic acids and esters, extracted from molasses through the action of a mixture of sulfuric acid, alcohol and an organic compound miscible in alcohol and non-solvent of sugars and inorganic salts. No. 1,976,590. Eugenio Antonio Vazquez, Havana, Cuba.

Process preparing a diatomaceous earth product; by permeating lumps of inert diatomite with combustible oil, and causing combustion of oil. No. 1,976,573. Walter Ray MacDonald, Los Angeles, Cal., one-half to Wm. M. Sutherland, Pasadena, Cal., and one-half to Neil W. Snow, Altadena, Cal.

Manufacture glue for use in a cold press; using reaction products in aqueous medium at normal temperature of blood treated with not less than approx. 3%, nor more than approx. 20%, caustic alkali, percentage being based on blood constituent. No. 1,976,436. Chas. N. Cone, Seattle, Wash., to I. F. Laucks, Inc., Seattle, Wash.

Process manufacture glue; treating mixtures of seed residue flours and blood albumen with caustic alkali in aqueous solution, and adding formaldehyde. No. 1,976,435. Chas. N. Cone and Harry Galber, Seattle, Wash., to I. F. Laucks, Inc., Seattle, Wash.

Apparatus for producing oxygen from liquid air. No. 1,976,388. Francis J. Eichelman, Pittsburgh, Pa., to Carbo-Oxygen Co., Pittsburgh, Pa.

Method accelerating hydration of glycerides intermixed in an aqueous solution with a relatively small quantity of ionized emulsifying agents. No. 1,976,376. Erwin F. Spellmeyer, East Orange, N. J.

Improved production crystalline anhydrous dextrose from a starch converted solution by crystallization in a vacuum pan. No. 1,976,361. Wm. B. Newkirk, Western Springs, Ill., to International Patents Development Co., Wilmington, Del.

Process preparing oxidation products of trichlorethylene, by oxidizing trichlorethylene to a mixture of dichloracetyl chloride and trichlorethylene oxide. No. 1,976,265. Martin Mugdan and Josef Wimmer, Munich, Germany, to Consortium fur Elektrochemische Industrie, G. m.b.H., Munich, Germany.

Process production of a resin-like mass, comprising a vinyl ester polymerized in the presence of trichlorethylene. No. 1,976,224. Willy O. Herrmann and Wolfram Haehnel, Munich, Germany, to Chemische Forschungsgesellschaft, m.b.H., Munich, Germany.

Method purifying raw salt by dissolving sodium chloride in liquid ammonia under pressure at a temperature between 0°C. and —.10°C. No. 1,976,222. Ryosaburo Hara, Sendai, Japan, to Asahi Garasu Kabushiki Kaisha (Asahi Glass Co., Ltd.), Tokyo, Japan.

Process wood preservative; composed of a toxic substance and an acid treated cracked pressure residuum as a carrier. No. 1,976,221. Ralph T. Goodwin, Elizabeth, N. J., John S. Rearick, Westport, Conn., and Howard P. Ferguson, Paterson, N. J., to The Dorr Co., Inc., New York, N. Y.

Process making ice. No. 1,976,204. Vanderveer Voorhees, Hammond, Ind,. and Harold V. Atwell, Bayside, N. Y., to Standard Oil Co., Chicago, Ill.

Process of maintaining desired residual water content in Portland cement while grinding; by grinding the clinker in a mill at an internal pressure above atmospheric pressure. No. 1,976,132. Harry McCaig Larmour and Stephen C. Pierce, Jr., Merced, Cal.

Method of activating adsorbent earths or clays. No. 1,976,127. Fred. W. Huber, Riverside, Cal.

Process polymerization of vinyl compounds in presence of film forming materials. No. 1,975,959. Walter E. Lawes, Wilmington, Del., and Lloyd T. Sandborn, Wausau, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method producing magnesia deficient in lime and calcium nitrate from dolomite. No. 1,975,954. Otto Kippe, Osnabruck, Hanover, Germany, to Klockner-Werke A.-G., Westphalia, Germany.

Method preparing pyrocatechol borate; fusing together pyrocatechol, boric acid and an organic base. No. 1,975,890. Ira Williams, Westown, N. J., and Arthur M. Neal, Wilmington, Del., to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Process for catalytic hydrogenation of primary alcohols. No. 1,975,853. Wilbur A. Lazier, Marshallton, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Composition of matter comprising a cellu-derivative, solvent and conditioning amounts of an alkyl ester of a benzo-cyclopentadiene carboxylic acid. No. 1,975,697. Anthony M. Muckenfuss and Virgil L. Hansley, Niagara Falls, N. Y., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Process and apparatus for making ketene. No. 1,975,063. Geo. H. Reid, So. Charleston, W. Va., to Carbide & Carbon Chemical Corp., New York, N. Y.

Process making carbon disulfide products; obtained by the chemical combination of acetaldehyde, a primary amine and carbon disulfide without liberation of substantial quantities of hydrogen sulfide. No. 1,975,588. Donald H. Powers, Penns Grove, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production resinous composition, comprising the product of reaction of phthalic anhydride, glycerine, succinic acid, ethylene glycol, abietic acid and Chinawood oil. No. 1,975,569. Walter W. Durant and Paul H. Schrutchfield, Pittsfield, Mass., to General Electric Co., Pittsfield, Mass.

Continuous cyclic process of producing beryllium fluoride by decomposition of beryl with ammonium hydrofluoride. No. 1,975,482. Rudolf Schulze, Bitterfeld, and Walter Brause, Leipzig, Germany, to I. G., Frankfort-am-Main, Germany.

Process preparing acetaldehyde from acetylene while using a mercury compound catalyst in an acid aqueous solution. No. 1,975,480. Paul B. Roth, Heinrick Elvert, and Franz Karl Steinberger, Frankfort-am-Main-Hochst, Germany, to I. G., Krankfort-am-Main, Germany.

Process making a resinous substance; using a primary carbohydrate phenol resin and glycerine, applying heat until substance becomes substantially infusible. No. 1,975,471. Jos. V. Meigs, Dobbs Ferry, N. Y., to Plastix Corp., Wilmington, Del.

Process manufacture an olefine; subjecting a straight-chain alkyl halide of from 4 to 5 carbon atoms and of one of the middle halogens to non-catalytic pyrolysis at a temperature above 450°C. No. 1,975,456. Henry B. Hass and Paul E. Weston, West Lafayette, Ind., to Purdue Research Foundation, West Lafayette, Ind.

Process improved production sodium sesquicarbonate and sodium bicarbonate. No. 1,975,499. George Lewis Cunningham and Homer Louis Robson, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York, N. Y.

Process production sodium hyposulfite and zinc compounds. No. 1,975,443. Max Bazlen and Emil Rieger, Ludwigshafen-am-Rhine, and Fritz Scholtz, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Method producing a graphitic carbon. No. 1,975,259. Ira H. Derby, Indianapolis, Ind., to Peter C. Reilly, Indianapolis, Ind.

Process for a light precipitated material; suspending a material rich in calcium and magnesium oxides in water, adding ammonia gas, then CO_2, thereby forming a double precipitate of calcium and magnesium carbonates. No. 1,975,213. Walter Hoge MacIntire, Knoxville, Tenn., to American Zinc, Lead & Smelting Co., St. Louis, Mo.

Process removing suspended matter from tetra alkyl lead; by agitating lead with an aqueous solution of a compound having pronounced wetting and detergent properties. No. 1,975,171. Alfred E. Parmelee, Carneys Point, N. J., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production methanol-free denaturant for ethyl alcohol, consisting of a liquid hydrocarbon and, as an essential denaturing element, washed alcohol oil. No. 1,975,092. Louis J. Figg, Jr., Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Process preparation methanol-free denaturant for ethyl alcohol, comprising fractions of a light acid oil, a washed oil, and an allyl alcohol. No. 1,975,091. Louis J. Figg, Jr., Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Production methanol-free denaturant for ethyl alcohol. No. 1,975,090. Louis J. Figg, Jr., Kingsport, Tenn., to Eastman Kodak Co., Rochester, N. Y.

Manufacture molded laminated products with inorganic binders; binder selected from group consisting of reversibly thermoplastic metaphosphate compounds and alkali metal monoborates. No. 1,975,080. Willis A. Boughton, Cambridge, and Wm. R. Mansfield, Boston, Mass., to New England Mica Co., Waltham, Mass.

Laminated mica product; flakes bound with a viscous substantially non-crystalline and bonding inorganic body containing a metaphosphate associated with water. No. 1,975,079. Willis A. Boughton, Cambridge, Mass., to New England Mica Co., Waltham, Mass.

Production flexible integrated mica product, of built-up mica flakes, cemented and bound together by a viscous inorganic binder. No. 1,975,078. Willis A. Boughton, Cambridge, Mass., to New England Mica Co., Waltham, Mass.

Process for an inorganic thermoplastic composition, composed of water associated with metaphosphoric acid, which does not crystallize or separate out on cooling from a hot solution, and an inert filler. No. 1,975,077. Willis A. Boughton, Cambridge, Mass., to New England Mica Co., Waltham, Mass.

Production metallic carbonyls by formation of an amalgam of a carbonyl-forming metal. No. 1,975,076. Owen G. Bennett, Balto., Md., to Catalyst Research Corp., Balto., Md.

Fine Chemicals

A process for the preparation of thiourea consist of introducing hydrogen sulfide into an aqueous solution of calcium cyanamid in the presence of carbon dioxide, solution being maintained at a temperature between room temperature and the temperature of melting ice, and thereafter acidifying the solution, removing insoluble material by filtration and evaporating the filtrate to recover the thiourea (U. S. No. 1,977,210).

Production alkali metal salts of the adenyl-pyro-phosphoric acids, salts being white, non-hygroscopic solid substances, soluble in water. No. 1,978,881. Carl Ludwig Lautenschlager and Fritz Lindner, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Manufacture halo-fluoro hydrocarbons; one step consisting of fluorating an aliphatic hydrocarbon, containing halogen other than fluorine, with antimony trifluorodichloride as the fluorating agent. No. 1,978,840. Albert L. Henne, Columbus, O., to General Motors Corp., Detroit, Mich.

Process for preparing para-sec-alkylamino phenols. No. 1,978,433. Randolph T. Major, Westfield, N. J., to Merck & Co., Inc., Rahway, N. J.

Process photographic fixing bath; being in aqueous solution, sodium thiosulfate, an aliphatic organic acid, and a salt of an aliphatic organic acid, in addition to salts formed in the solution by interaction of any of its ingredients. No. 19,354. Reissue. Felix A. Elliott, New York, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Production allergen solution; composition consisting of an allergic proteinous substance in a menstrum of an approx. isotonic aqueous solution of a sugar. No. 1,977,803. Marjor B. Moore, Waukegan, Ill., to Abbott Laboratories, North Chicago, Ill.

Preparation secondary-butyl-carbinyl-ethyl barbituric compound. No. 1,977,561. Horace A. Shonle, Indianapolis, Ind., to Eli Lilly & Co., Indianapolis, Ind.

Process for production reaction product of epichlorhydrin and a water soluble primary amine. No. 1,977,253. Otto Stallmann, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method recovering optically active dextro-rotatory glutamic acid from its mineral acid salts without racemization; neutralizing combined mineral acid of said salts with an alkyl derivative of glycocoll. No. 1,976,997. Seizo Kanao, Azabu Ku, Tokyo, Japan, to Kabushiki Kaisha Suzuki Shoten, Tokyo, Japan.

Process preparing esters of 2-carboxy-5-amino-diphenyl. No. 1,976,940. Wm. S. Jones and Wm. Braker, Brooklyn, N. Y., to E. R. Squibb & Sons, Brooklyn, N. Y.

Production compound from group consisting of dialkyl-amino-alkyl esters of alkoxy-carboxy-diphenyls and inorganic salts thereof. No. 1,976,924. Walter G. Christiansen, Glen Ridge, N. J., and Adelbert W. Harvey, Pittsburgh, Pa., to E. R. Squibb & Sons, Brooklyn, N. Y.

Production compound from the group consisting of the amino-alkyl esters of carboxy-alkoxy-amino-diphenyls and inorganic salts thereof. No. 1,976,923. Walter G. Christiansen, Glen Ridge, N. J., and Adelbert W. Harvey, Pittsburgh, Pa., to E. R. Squibb & Sons, Brooklyn, N. Y.

Production compound of group consisting of dialkyl-amino-alkyl esters of hydroxy-3-carboxy-diphenyls and inorganic salts of such esters. No. 1,976,922. Walter G. Christiansen, Brooklyn, N. Y., and Adelbert W. Harvey, Pittsburgh, Pa., to E. R. Squibb & Sons, Brooklyn, N. Y.

Production compound of group consisting of the dialkyl-amino-alkyl esters of dialkyl-amino-alkoxy derivatives of 3-carboxy-diphenyl and inorganic salts thereof. No. 1,976,921. Walter G. Christiansen and Wm. Braker, Brooklyn, N. Y., to E. R. Squibb & Sons, Brooklyn, N. Y.

Method preparing colloidal metallic bismuth; reducing a bismuth compound in a water solution containing mannite and a protecting colloid under a layer of an inert, water-immiscible, vaporizable, oxygen-evaporating liquid. No. 1,976,920. Walter G. Christiansen, Glen Ridge, N. J., Alfred E. Jurist, Brooklyn, and Eugene Moness, Far Rockaway, N. Y., to E. R. Squibb & Sons, Brooklyn, N. Y.

Method producing phenolic derivatives of diaryl sulfides. No. 1,976,732. Treat Baldwin Johnson, Bethany, Conn., to Sharp & Dohme, Inc., Phila., Pa.

Process for manufacturing article having a closely adhering coating decomposable by sunlight; and a light filtering overcoating, composed of an organic derivative of cellulose and a compound of the group of di-p-toluene sulfonimide, triphenyl guanidine, and triphenyl phosphite. No. 1,976,359. Thos. F. Murray, Jr., Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Process for photographic developer in dry form; being an alkali metaborate and a developing agent. No. 1,976,299. Harold D. Russell, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Process for neutral complex compound of pentavelent antimony with alipatic hydroxy carboxylic acids. No. 1,975,803. Hans Schmidt, Vohwinkel, near Elberfeld, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Production salts of amino-acridine compounds with sulfonic acids. No. 1,975,387. Louis Benda, Frankfort-am-Main, Germany, to Winthrop Chemical Co., Inc., New York, N. Y.

Method concentration vitamine content in yeast from the brewery. No. 1,975,169. Axel Birger Octavus Norrbin, Strangnas, Sweden.

Preparation ketone-amines; bringing a non-lead heavy metal halide into contact with a ketone and a secondary aromatic amine, heating materials to produce a ketone-amine reaction product. No. 1,975,167. Ludwig Meuser, Naugatuck, Conn., to Naugatuck Chemical Co., Naugatuck, Conn.

Patents—Coal Tar

Method and apparatus for recovering and processing by-products at a coal distillation plant. No. 1,979,046. Stuart Parmelee Miller, Englewood, N. J., to Barrett Co., New York, N. Y.

Method preparing phenol-aldehyde condensation products which may be molded. No. 1,978,821. Fritz Schmidt, Troisdorf, near Cologne-am-Rhine, Germany.

Production sulphone-morpholine compounds of the amino-anthraquinone series. No. 1,978,777. Karl Zahn, Frankfort-am-Main-Hochst, and Willi Gadke, Hofheim-am-Taunus, Germany, to General Aniline Works, Inc., New York, N. Y.

Process separation carbazole from anthracene; first causing crude mixture of both to react with furfural in presence of a weak alkali. No. 1,978,580. Alphons O. Jaeger, Mt. Lebanon, Pa., to American Cyanamid & Chemical Corp., New York, N. Y.

Catalyzer for vapor phase partial oxidation of organic compounds; a porous contact mass of a relatively inert, relatively infusible, rigid, porous carrier, impregnated and coated with a metal oxide which is an oxidation catalyst. No. 1,978,506. Elton B. Punnett, Buffalo, N. Y., to National Aniline & Chemical Co., Inc., New York, N. Y.

Apparatus for carbonizing bituminous materials. No. 1,978,139. Arthur J. Mason, Homewood, Ill., Continental Illinois National Bank & Trust Co. of Chicago, executor of said Arthur J. Mason, deceased.

Process improved production diphenyl. No. 1,978,069. Wm. H. Williams, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Process for condensation product of the anthraquinone series. No. 1,978,062. Heinz Scheyer, Frankfort-am-Main, Germany, to General Aniline Works, Inc., New York, N. Y.

Process for manufacturing perylene; treating 2.2'-dinaphthyl with anhydrous aluminum chloride at a temperature of about 130 to 160°C. No. 1,977,768. Friedrich Kuhrmann, Dessau in Anhalt, Germany, to General Aniline Works, Inc., New York, N. Y.

Process manufacture halogenated pyridines; heating to a gaseous phase a halogen of the chlorine and bromine class; independently heating to a gaseous phase a pyridine; finally effecting a reaction between these components while in their gaseous phases. No. 1,977,662. Johan Pieter Wibaut and Herman Johannes den Hertog, Jr., Amsterdam, Netherlands, to Dow Chemical Co., Midland, Mich.

Process producing amino-azobenzenes. No. 1,977,266. Miles Augustinus Dahlen, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production a gummy, hygroscopic, water soluble mass, being substantially identical with the product obtained by circulating ammonia gas over an alcoholic solution of epichlorhydrin, until reaction product is practically free of organic bound chlorine. No. 1,977,251. Otto Stallmann, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Production substitution derivatives of BZL, BZL'-dibenzanthronylselinide. No. 1,977,242. Melvin A. Perkins, Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Method preventing deposition of naphthalene in gas mains; by injecting into the gas, oxygenated, non-corrosive hydrocarbon oils, then separating the gas and oils. No. 1,977,101. Waclaw von Piotrowski and Josef Winkler, Drohobycz, Poland.

Process treating tars. No. 1,976,908. Lester Wittenberg, New Rochelle, N. Y., to The Barrett Co., New York, N. Y.

Improved method of making polyphenyls, using a mixture of benzene and diphenyl, pyrolyzed by heating at between 650 and 950°C. No. 1,976,468. Wm. H. Williams, Midland, Mich., to Dow Chemical Co., Midland, Mich.

Process of operating the gas collector main of a coal distillation plant whereby the gases leave the main at a high temperature and tar and pitch are used for preventing the accumulation of pitch or coke within the main. No. 1,976,356. Stuart Parmelee Miller, Englewood, N. J., to The Barrett Co., New York, N. Y.

Method tar distillation, producing an oil of high tar acid content. No. 1,976,243. Stuart Parmelee Miller, Englewood, N. J., to The Barrett Co., New York, N. Y.

Process making nitrogenous derivatives of the anthraquinone series; which constitute dark blue powders which dissolve in acetic ester to blue-green solutions. No. 1,976,167. Paul Grossmann, Basel, Switzerland, to Society of Chemical Industry in Basle, Basel, Switzerland.

Process preparing 2-hydroxyanthracene-3-carboxylic acid. No. 1,976,145. Ludwig Sander, Frankfort-am-Main, and Sebastian Gassner, Leverkusen, Germany, to General Aniline Works, Inc., New York, N. Y.

Process hydrogenating a pyridine compound. No. 1,975,843. Ivan Gubelmann and Clyde O. Henke, So. Milwaukee, Wis., to E. I. du Pont de Nemours & Co., Wilmington, Del.

Retort oven for low temperature carbonization. No. 1,975,621. Jos. Schafer, Dortmund, Germany, to Compagnie Generale de Distillation et Cokefaction a Basse Temperature et Miniere (Intertrust) Societe Anonyme, Glaris, Switzerland.

Process for dehydrogenation of benzine, by applying mixture of ammonium vanadate, cobalt nitrate and phosphoric acid to active charcoal, treating catalyst thus obtained with hydrogen and carbon disulfide. No. 1,975,476. Mathias Pier, Heidelberg, and Ernst Donath, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Process desulfurizing crude benzol by treatment with a gas comprising hydrogen at elevated temperature and under pressure. No. 1,975,475. Mathias Pier, Heidelberg, and Walter Simon, Ludwigshafen-am-Rhine, Germany, to Standard-I. G. Co., Linden, N. J.

Process production solid stable diazoazo salts; being brownish-red powder of very good stability. No. 1,975,409. Karl Schnitzspahn, Offenbach-am-Main, and Rudolf Jung, Frankfort-am-Main-Oberrad, Germany, to General Aniline Works, Inc., New York, N. Y.

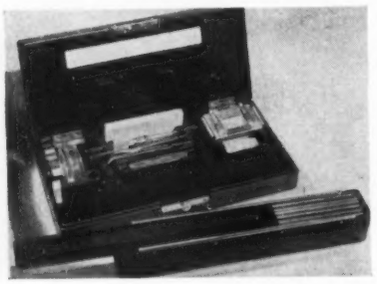
Process preparing 1.4-diamino-anthraquinone-2.3-dilsufonic acid. No. 1,975,386. Fritz Baumann, Leverkusen-I. G. Werk, Germany, to General Aniline Works, Inc., New York, N. Y.

Production 2- (3′-Hydroxynaphthyl-2′) -4-Hydrox-6.7-Benzo-Pseudoaziminobenzenes; valuable intermediates for the production of dyestuffs. No. 1,975,383. Arthur Zitscher, Offenbach-am-Main, Germany, to General Aniline Works, Inc., New York, N. Y.

New Equipment

A monthly digest of new equipment of interest to the chemical and process industries.

The new Wulff pH portable colorimeter determines quickly and easily the hydrogen ion concentration (active acidity) in highly colored, turbid, viscous and semi-solid mediums, as well as in water-white soluble solutions. It is simple in operation and gives readings accurately to 0.1pH. The Wulff pH Tester is useful to any industry or laboratory where pH control is necessary. For example: Chemical, agriculture, cosmetics, fermentation, food industries, leather industry, paper and pulp, rubber, textiles, etc. Device is housed in a sturdy Bakelite molded case. **Q C 188**



Aids in determining hydrogen ion concentration easily and quickly

New Floor Surfacer

"Armorock" is a new floor surfacing and repairing material which because of its resistance to acids and alkalies as well as its ease of application, should appeal to the chemical plant superintendent. **Q C 189**

Homogenizers In Chemical Operations

While the use of homogenizers can hardly be termed an innovation, for they have found wide application in the dairy and ice cream industries for several years, nevertheless in the chemical and process industries and in the manufacture of many chemical specialties their possibilities for improving products have not been utilized to anything like the degree they should. Manufacturers who are finding difficulties in maintaining stable emulsions and those who wish to improve products of this type will be interested in a new model placed on the market by one of the outstanding manufacturers of this type of equipment. **Q C 190**

Economical Cleaning of Castings

A new centrifugal blast cleaning machine that cleans various size and shape castings without the use of compressed air and with several other important innovations, has just been announced. **Q C 191**

Perhaps The Answer To the Storage Problem

Those faced with an inadequate storage space problem may be able to solve it, or at least improve the situation with a tiering fork truck and the use of flat wooden pallets. These are loaded with containers and transported to storage and tiered. Thus, if the storage facilities can not be expanded horizontally, it is possible to gain more space horizontally. In some instances, the load is actually shipped from plant to consumer without removal from the original pallet. Inexpensive, they can be discarded. **Q C 192**

An Aid to Boiler Room Economy

To supply the increasing demand of industrial establishments for higher boiler room economy, one of the large instrument companies has developed a new steam flow-air boiler meter particularly well suited to industrial service. This meter records steam flow from the boiler, air flow supplied for combustion and flue gas temperature—all on one 12-inch diameter uniformly graduated chart. It also indicates steam flow on a porcelain enameled scale and integrates the total steam flow on a 6-digit counter which reads like an automobile mileage register. The three important factors of boiler operation—combustion efficiency, steam output, and flue gas temperature—are combined and coordinated in this one meter. **Q C 193**

Colloid Mill With New Features

A small colloid mill, moderately priced, and said to be the first mill of its kind which will operate consistently at a set speed of 3600 r.p.m. and yet perform the operation involved. All parts in contact with the material are of Monel. **Q C 194**

Measuring Water Level and Feed Water Flow

A new meter indicates and records both boiler water level and feed water flow for use in boiler plants where it is desired to have both an indication and record of these factors on the operating floor. For purposes of comparison, it is very valuable to have the records of feed water flow and boiler water level recorded on the same chart where they are coordinated as to time and can be interpreted easily without reference to additional records or calculations. **Q C 195**

Tractor Suitable to Chemical Plants

A new all-purpose industrial tractor, in 3 models, with a 46 h.p. 8-cylinder power plant. Designers claim for it an efficiency hitherto unknown in industrial tractors—a pound of drawbar pull for every pound of tractor weight. **Q C 196**

A Novel Packing Idea

Want to reduce packing costs? A new paper excelsior shredder takes waste paper of all sorts and turns it into a packing material which, it is said, is cleaner than using sawdust or ordinary wood excelsior. **Q C 197**

New Thermometer

A new portable, lightweight recording thermometer with either self-contained or long distance type thermometers. A companion instrument with similar features may be had for recording pressures. **Q C 198**

Something New In Insulation

Laytex, a new insulation which the maker believes will prove revolutionary in a score of industries, including the chemical, mining, petroleum, etc. A patented process removes all proteins, sugars and water solubles from liquid rubber latex-materials which make a sieve of ordinary insulation. **Q C 199**

Briefly Summarized

Screen type pulverizer which, it is reported, is absolutely dust tight, and reduces material being ground to such a fineness that it requires no sifting. **Q C 200**

Color, reflectance, opacity are now capable of careful measurement by a new instrument. **Q C 201**

A specially-designed pump for handling molten sulfur is now on the market. **Q C 202**

Chemical Industries,
25 Spruce Street,
New York City.

I would like to receive more detailed information on the following: (Kindly check those desired.)

Q C 188	Q C 193	Q C 198
" 189	" 194	" 199
" 190	" 195	" 200
" 191	" 196	" 201
" 192	" 197	" 202

Name .....

Title .....

Address .....

Plant Operation

Cleaning Caustic Drums

A member of the chemical section reports to the National Safety Council: "Our returned empty caustic soda drums are cleaned with hydrochloric acid. A chemical reaction is, of course, setup and the hydrochloric acid becomes a neutralizing agent. However, if an excess of hydrochloric acid is used it has an action upon the iron in the drum in which the hydrogen is released and the chlorine combines with the iron and becomes iron chloride.

"In this particular case the hydrochloric acid stood for some time instead of being washed out immediately with water. When an extension cord light was inserted in the bung hole to inspect the interior of the drum the bulb was broken and the hydrogen was ignited. The resulting explosion severely injured the operator about the face and neck."

Answer of the Chemical section's News Letter was: "A vapor and shock-proof light would have prevented the accident. Also the drums should in all cases be washed out with water before inspection."

Antidote For Phosphorus

Chemiker-Zeitung, Oct. 31, suggests a combination of grape sugar and insulin intravenously applied as an antidote for phosphorus poisoning.

Plant Maintenance

Resistance of materials of construction to attack by chemical agents depends not only on their composition, both ultimate and proximate, but also on their texture. This is illustrated by the differences between the behavior of wrought iron and mild steel, the attack of sulfates on limestone, and the action of hard and soft waters on concrete dams. On a finer scale, the resistance of metals and alloys to chemical attack is affected by the grain size, the presence of cold-worked regions, the smoothness of the surface, and the directional effects of rolling and drawing. In steels, the distribution of the carbides and the size of their particles influence the rate of attack by acids. The texture of the resisting or 'stainless' steels to steam at high temperatures depends on the distribution of the compounds precipitated from the solid during heating. Oxidizing agents produce a thin skin on the surface of many metals, and this protects against further action, or fails to protect, according to the texture of the oxide so formed. On a yet finer scale, certain classes of solids containing "giant molecules" have their chemical properties determined by the shape of those molecules, whether forming thin sheets, fibres, or a loose network. Examples are graphite and other forms of carbon, textile fibres and the zeolites. The study of texture, usually by means of the microscope but also making use of many physical methods, is therefore an essential part of the study of chemically resistant materials. Review in *Nature* (British), of Dr. C. H. Desch's lecture "Texture and Chemical Resistance" before the Institution of Chemical Engineers.

Patents—Agricultural Chemicals

Plant protective agent, containing basic copper sulfate. No. 1,979,213. John H. Fales, Balto., Md., to Bowker Chemical Co., Carteret, N. J.

Process for preparation, in dry powdered form, of animal, fish, and vegetable matter. No. 1,979,124. Henri Louis Paul Tival, Sainte-Feyre, France.

Process production fertilizer, comprising equally homogeneous granules containing urea and calcium carbonate. No. 1,977,628. Wm. Kenneth Hall, Norton-on-Tees, England, to Imperial Chemical Industries, Ltd., London, England.

Method of removing impurities in the process of converting phosphate rock into calcium nitrate and a solution containing free phosphoric acid. No. 1,976,283. Erling Johnson, Odda, Norway, to Odda Smelteverk A/S, Odda, Norway.

Process for recovering potassium salts from minerals. No. 1,975,798. Everett P. Partridge, Park View Estates, and Foster Fraas, New Brunswick, N. J., to the United States of America as represented by the Secretary of Commerce.

Process for removal of residual poisons from fruits and vegetables, by subjecting them to a dilute solution of an alkali. No. 1,975,361. Arthur M. Henry, Haddonfield, N. J., to the Government and People of the U. S.

Research

"Product Development" is a detailed study of how certain successful companies have widened markets and increased profits by re-creating existing products for developing new ones made by the Policyholders Service Bureau of the Metropolitan Life Insurance Co., 1 Madison ave., N. Y. City. Seventy-five companies joined in supplying data for this survey, among which were several concerns prominent in the chemical and allied fields. Copies are available.

Boron Carbide—A New Abrasive

Boron Carbide as now produced consists entirely of crystalline abrasive boron carbide in stable form and with an average composition closely approximating the formula B_4C. Material can now be produced in commercial quantities.

Process is similar to that for the manufacture of silicon carbide, using a resistance type furnace with its graded temperature zones. The zones make possible the preparation of a carbide product of very high melting point from raw material such as boric acid which is volatile. Reason for the high graphite content of some products is due to the loss of boron which occurs in other furnacing processes.

The first step in the manufacture of boron carbide is the dehydration of commercial boric acid which is more economically carried on outside the final furnacing operation. The anhydrous glass is combined with high purity coke in a special resistance furnace. A central heating core is provided and the surrounding mixture is heated up to the reaction point, which is about 2,500 to 2,600° C. Inside of a zone which consists largely of freely developed crystals of boron carbide there is a zone of molten carbide which forms a thick ingot. This melting is a characteristic difference from silicon carbide and is one of the unique properties of boron carbide which makes possible special applications. Raymond R. Ridgway, research engineer for the Norton Co., before the Electrochemical Society. *Canadian Chemistry & Metallurgy.*

The Literature

Articles of interest to the chemical and process industries particularly noted in a monthly review of the U. S. and foreign periodicals.

Chemical Production. "Pressure Synthesis a Possibility for Sulfuric acid Manufacture," by Ernst Berl. This is a digest of a very much discussed paper delivered at the recent meeting of the A. I. Ch. E. at Pittsburgh. It deals with a possible development in sulfuric manufacture that will be truly revolutionary. *Chemical & Metallurgical Engineering*, November, p571.

Electroplating. "Recent Developments in Electroplating," by S. Wernick. *Chemistry and Industry*, British, Nov. 9, p948.

Fertilizers. "Composition of Potash Fertilizer Salts for Sale on the American Market," by J. W. Turrentine. *I. & E. C.*, Nov., p1224.

Fine Chemicals. "Citric Acid Fermentation," by W. P. Doelger and S. C. Prescott. *I. & E. C.*, Nov., p1142.

Fine Chemicals. "Domestic Iodine Industry Demands Recognition," by Paul D. V. Manning. *Chemical & Metallurgical Engineering*, November, p568.

Glass. "Calculations on Raw Materials Used in Glass Manufacture." *Glass*, British, Oct., p385.

Oils. "The Drying Qualities of Soybean Oil," *Paint, Oil and Chemical Review*, Nov. 1, p68.

Naval Stores. "Oxidized Turpentine," by Paul M. Horton and W. F. McCormick. Discusses preparation and use in lacquer formulation. *I. & E. C.*, Nov., p1226.

Plant Operation. "Air Classification in pulverizing," by Harlowe Hardinge. *I. & E. C.*, Nov., p1139.

Paper. "Accelerated Aging Tests for Determining Permanence of Papers," by George A. Richter. *I. & E. C.*, Nov., p1154.

Plastics. "Cresylic Acid Resins, Varnishes, and Moulding Powders," by William McHutchison. Discusses manufacture, plant layout, etc. *Industrial Chemist*, British, Oct., p383.

Raw Materials. "Recent Developments Relating to Oil Extraction by the Solvent Process," by E. W. Schmidt. *Paint, Oil & Chemical Review*, Nov. 15, p9.

Soap. "Soap: Manufacturer to Consumer," by Jay C. Harris. *American Dyestuff Reporter*, Nov. 5, p614.

Soap. "Naphthenic Acids Soaps," discusses possibilities of their uses in specialty soaps and disinfectants. *Soap*, November, p21.

Soap. "Soap Manufacture—What Progress Since 1870?" *Soap*, November, p17.

Textiles. "The Importance of Aluminum in Textile Technology," by Arthur Pettinger. Continuation of a series in which the chemistry of iron, copper and zinc and their salts, from the standpoint of textile technology (Jan. 15, June 4 and Aug. 27) was dealt with. *American Dyestuff Reporter*, Nov. 5, p605.

Equipment Booklets

E287. Paul O. Abbe, Inc., Little Falls, N. J. A new leaflet describes the various porcelain products for use in pebble mills. Laboratories, both industrial and school, will find the information on porcelain jar mills of distinctive value.

E288. Aluminum Co. of America, Pittsburgh. *Aluminum News Letter* for November contains among other interesting news items on novel aluminum uses, a short description of the Alumilite Process which places a protective coating on the metal.

E289. Consolidated Products Co., 15 Park Row, N. Y. City. This large dealer in used chemical and allied industries equipment issues a monthly newspaper, *Consolidated News*, which should be regularly received by plant managers, laboratory heads, purchasing agents, etc. This Department will be glad to arrange for readers of C. I. to do so. This month's issue stresses purchase of Consolidated Iron & Chemical Co.'s plant, excess equipment from a number of fine chemical and pharmaceutical manufacturers, etc.

E290. The J. H. Day Co., Cincinnati, Ohio. Pamphlet 362 on Day Ro-Ball Stabilized Gyrating Screens, just off the press, is a splendidly illustrated brochure on the various types of screens made by this company. In addition, the last part is devoted to photographs of Day auxiliary equipment for use with the Ro-Ball Gyrating Screen-mixers, grinders, pulverizers, a complete line of process equipment.

E291. Filtration Engineers, Inc., Summer ave. & Erie R. R., Newark, N. J. A splendid booklet "In The Chemical Processes Getting The Cake on Strings" has just been released which admirably describes F.E., Inc., Continuous filters and a copy should be on the "Five-Foot Technical Bookshelf" of every plant man with a filtering operation or problem on filtering to solve. Consultants will find it particularly valuable.

E292. General Electric Co., Schenectady, N. Y. "Industrial Cable," a new publication describing and listing all standard types of insulated wire and cable used by industrials for transmission, distribution and control, and used on or with electric equipment such as mining and chemical and process equipment, locomotives, arc welders, neon signs, etc. Publication, of 128 pages and with an ornamental cover, does not cover the paper-insulated types of cable, used principally for transmission of large blocks of power at the higher voltages. Such types are custom-built, and generally require the assistance of experienced engineers on both application and installation. "Industrial Cable," GEA-1838, is a companion to Bulletin GEA-1837, an 80-page publication on "How to Select Insulated Cable."

E293. Hardinge Co., York, Pa. A 56 page informative catalog, just released by this company, is essentially a treatise on grinding and contains much valuable information on subjects such as: Open versus closed circuit grinding; ball mills versus pebble mills; the Hardinge Conical Mill; classification,—wet and dry; air classifiers for dry grinding mills; counnter-current classifier for wet grinding mills; chemical and industrial pulverising methods; ore reduction and concentration; coal pulverization —storage and unit system; The Hardinge Constant Weight Feeder; operating data—specific and general; and capacity and dimension tables.

E294. H-B Instrument Co., 2518 N. Broad st., Philadelphia. Latest release gives full data on the H-B line of hydrometers. Catalog is divided into sub-headings, according to the industry which uses that particular group of hydrometers. For instance, pages 8 and 9, center spread, show the refining industries; on page 10 the instruments for the use in the sugar, dyeing, and tanning industries are reviewed; on page 11—the distilling and rectifying industries, as well as other valuable technical data and tables in the back of the book.

E295. International Nickel Co. 67 Wall st., N. Y. City. Fall number of *Inco* contains 2 specially interesting articles for the chemical engineer, one, a discussion of the equipment used in the making of "Catalin" a cast phenolic entitled "Science Makes Jewelry From Carbolic Acid." The 2nd article of special interest is "How Caustic Soda Plants Protect Product and Equipment." Alloy specifications are given for each piece of equipment.

E296. The Linde Air Products Co., 205 E. 42nd st., N. Y. City. A completely revised "Precautions and Safe Practices" is now available. Since its original publication several years ago, it has come to be accepted as the standard reference work on this important phase of safety in industry, as attested by the thousands of copies that have been distributed. While the subject of safety is well standardized, and therefore subject to but little change, the advances in the oxy-acetylene process itself, and its widening use during recent years, have shown where additional emphasis in safety precautions is needed, and have necessitated some new suggestions. All of this has been incorporated in the new edition, to fill the demand for a more up-to-date handbook. Many provisions in the test have been regrouped to form a more coordinated whole, and considerable amplification of ideas can be noted throughout. Everyone responsible in any way for the storage, care or handling of oxy-acetylene welding and cutting equipment should have a copy of this booklet for careful study and constant reference.

E297. The Linde Air Products Co. Another valuable addition to oxy-acetylene literature is "Recommended Practices for Gas Cutting of Structural Steel." This is the first complete and authoritative treatment of this subject, and for the first time sets up qualification tests for the predetermination of good workmanship from the standpoint of dimensional accuracy and smoothness of cuts. These tests, of course, apply only to hand blowpipes, and are for the present restricted to the plain low carbon steels. Booklet is certain to become a standard reference work on this subject, as it combines under one cover the material in current regulations as given in bulletins issued by various prominent regulatory bodies. Hence it will be welcomed by engineers, contractors, supervisors and inspectors, as well as by operators of oxy-acetylene cutting equipment, as a reliable means of gauging and controlling the quality and safety of cutting operations.

E298. Linde Air Products Co. An article in the November issue of *Oxy-Acetylene Tips* discusses stainless steel containers (of special importance to the chemical, dyeing, pharmaceutical, soap, fine chemical fields, etc.), and the problem of welding.

E299. New England Tank & Tower Co., Everett, Mass. A new bulletin, No. 341, discusses "New England agitators, drives, stirrers, and accessories." Have you a corrosion problem either in stirring equipment or storage or mixing tanks? This bulletin may contain just the data you are looking for.

E300. The Orville Simpson Co., 1230 Knowlton st., Cincinnati. Bulletin No. 9 describes and illustrates Rotex Screens, stressing the points, accuracy, capacity and low cost. Company offers to make a sample test of materials in the Testing Dept. The only expense is supplying 50 to 100 lbs of the product.

E301. The Patterson Foundry & Machine Co., East Liverpool, Ohio. A most complete treatise on ball, tube, and rod mills, and the subject of grinding in general. Specific grinding suggestions are made on a number of chemical materials.

E302. Republic Steel Corp., Massillon, Ohio. Book contains 64 pages and is profusely illustrated. In simple, non-technical language it tells the step-by-step story of modern manufacture of sheet iron, tracing production from the ore mine to the final inspection of the completed sheet. It contains gauge tables and an interesting glossary of metallurgical terms.

E303. John Robertson Co., 121 Water st., Brooklyn. "Robertson Reminders" is an interesting house organ and contains news of equipment produced by this pioneer in design and construction of high pressure machinery.

E304. The W. W. Sly Mfg. Co., 4700 Train ave., Cleveland Ohio. Bulletin S-76, shows and describes the new type EC Dust Filter, an improvement in many respects over the previous Sly Dust Filter design, particularly with reference to greatly simplified construction for easier access and reduced maintenance. Also, there is an increase in the amount of filter cloth.

E305. Propellair, Inc., Springfield, Ohio. This company's slogan "To keep business moving, keep production moving, keep air moving" is the theme about which is built a specially fine and well-illustrated leaflet on the question of ventilation. Certainly the chemical and allied fields should and are interested in this problem.

E306. Weston Electrical Instrument Corp., 590 Frelinghuysen ave., Newark, N. J. A new booklet which illustrates and describes in detail the full line of Weston relays. Somewhere in this booklet, you may find a practical solution to your problems, whether they include the control of temperatures, chemical processes, voltages and currents, alarm systems, etc.

E307. The Manton-Gaulin Mfg. Co., St. Johnsbury, Vt. Homogenizers are fully described in this booklet.

E308. Phoenix Metal Cap Co., 2444 W. 16th st., Chicago, Ill. *The Phoenix Flame* for December contains some very interesting illustrations of containers capped with Phoenix caps as well as several short articles of worth, "Cellophane Adhesives," for example.

E309. J. L. Ferguson Co., Chicago. *Packomatic* for November discusses safety plan of the International Salt Co., details of which are worth every plant and company executive considering.

E310. Cibara Mfg. Co., 2234 Eugenia st., St. Louis. Getting the right container is often only half the problem. New leaflet describes "Super-tex," a special glue for fibre and corrugated shipping cases, which is said to seal in 20 seconds. Other distinctive advantages are also enumerated.

Chemical Industries,
New York City.
25 Spruce Street,

I would like to receive the following booklets; specify by number: .....

.....

Name .....
Title .....
Company .....
Address .....

Chemical Markets & News

Independent Surveys Conclusively Show Chemical Industry's Outstanding Labor Record—Cyanamid's Bell Plays An Important Part In Framing N. A. M. Recovery Program—

That American chemical industry throughout its history has been singularly free of labor troubles is a fact that has been commented upon time and again by those both in and out of the industry. Even in such a period of depression as the present one labor disputes have practically been non-existent in the chemical field. That the basic reason has been the excellent treatment of the workers in the industry is indicated by 2 reports issued within the past 10 days from sources working entirely independent of each other. The first is a survey made by the National Industrial Conference Board and the other is a study of recent trends in the chemical manufacturing industry made by the Research and Planning Division of the NRA and published in the Nov. 26th issue of *The Blue Eagle* (the official publication of the NRA) and summarized in the Washington news section of this issue of CHEMICAL INDUSTRIES on p. 531.

On Apr. 23, '34, after considerable study on the subject, the Committee on Statistics of the Chemical Alliance (George W. Merck, chairman) issued a statistical bulletin to all members of the Alliance, announcing that a confidential survey would be undertaken by the National Industrial Conference Board to determine the general facts as to the distribution of labor throughout the chemical manufacturing industry.

The survey was not intended to show a classification of rates paid, but rather for the purpose of developing in particular how the matter of basic wage rates and permitted exceptions were being applied under the provisions of the Chemical Code. Returns were received from a total of 337 chemical companies, a few of which made a combined return for all units operated, but the tabulations cover 598 distinct factory units. These returns were sent direct by the members to the National Industrial Conference Board and the resulting compilation made by them.

It is of interest to note that 39.0% of all the factory units are those having 20 or less employees and that 26.1% of all the employees that could be classified are found in plants having from 501 to 1,000 employees. The following table, in which factory units are classified according to number of factory workers per unit, provides the figures upon which these statements are based.

	Number		Per Cent. of Total Classified	
Size of Unit	*Establishments*	*Employees*	*Establishments*	*Employees*
No employees ..	*20	....	3.3	....
1-5	82	246	13.7	0.4
6-20	151	1,752	25.3	2.9
21-50	133	4,363	22.2	7.3
51-100	79	5,544	13.2	9.2
101-250	72	11,410	12.0	19.0
251-500	31	10,493	5.2	17.5
501-1,000	23	15,660	3.8	26.1
1,001 or more ..	7	10,645	1.2	17.7
Total Classified	598	60,113	100.0	100.0
Not classified ..		9,832		
Total		69,945		

* Not operating.

Of the total 89,048 employees, 69,945 or 78.5% are found in the factories and 19,103 or 21.5% are in office or non-factory employment.

Of the total, 7,943 or 8.9% are women. There are more than twice as many women employed in the office group than in the factories and while women form 28.0% of all office workers, they represent only 3.7% of the total factory employees. Of the total 89,084 employees in the chemical manufacturing industry, 4,870 or 5.5% receive compensation based on 1929 rates—but of these 3,020 or 62.0% are paid at rates higher than those paid in 1929. Statistical data is given.

Special Divisions Analyzed

Apprentices and learners number 557, or 1.7%—reported by establishments having 32,575 employees. Of these apprentices and learners, 509 or 91.4% receive more than the legal minimum. Handicapped workers were reported by establishments employing 15,239 of which this group constituted 171 or 1.5%. Of these 151 or 89.0% received more than the legal minimum.

Classes	*Both Sexes*	*Males*	*Females*
All Employees	89,048	81,105	7,943
Location:			
North. Dist.	78,866	71,353	7,513
South. Dist.	10,182	9,752	430
Limitation of Hours:			
Exempt	13,852	13,501	351
Limited	75,196	67,604	7,592
Kind of Work:			
Factory	69,945	67,353	2,592
Office and non-factory ..	19,103	13,752	5,351
Basic Rates for Workers:			
North. Dist.—40c or more	76,077	70,377	5,700
1929 rates	2,789	976	1,813
South. Dist.—35c or more	8,101	7,717	384
1929 rates.	2,081	2,035	46
Apprentices or Learners:			
Employees of establishments reporting	32,575	29,314	3,261
Number of apprentices or learners	557	412	145
Handicapped Workers:			
Employees of establishments reporting	15,239	14,930	309
Number of handicapped workers	171	170	1

More Than Code Requires

Commenting on the statistics gathered in the survey, the National Industrial Conference Board states: "Reviewing the record as a whole, the evidence is clear of a wholehearted effort to abide by the provisions of the Code, and indeed to lean over backward in so doing. The industry can justly claim that its actual practice in wage rates is more liberal to the worker than the provisions for his welfare embodied in the Code."

Wages of Employees in Chemical Manufacturing Industry Summarized

Classes	*Both Sexes*	*Males*	*Females*
ALL ESTABLISHMENTS:			
Paid at basic rates or more	84,178	78,194	6,084
Paid at rates, based on 1929 rates	4,870	3,011	1,859
Of the latter, paid same as 1929	1,067	853	214
" more than 1929 and equal minimum..	783	354	429
" more than 1929, more than minimum	3,020	1,804	1,216
NORTHERN ESTABLISHMENTS:			
Paid at basic rate (40c) or more	76,077	70,377	5,700
Paid at rates based on 1929 rates	2,789	976	1,813
Of the latter, paid same as 1929	633	450	183
" more than 1929, and equal minimum..	486	69	417
" more than 1929, more than minimum	1,670	457	1,213
SOUTHERN ESTABLISHMENTS:			
Paid at basic rate (35c) or more	8,101	7,717	384
Paid at rates based on 1929 rates	2,081	2,035	46
Of the latter, paid same as 1929	434	403	31
" more than 1929 and equal minimum..	297	285	12
" more than 1929, more than minimum	1,350	1,347	3

Eastman Nitrocellulose Products

OTHER EASTMAN CHEMICALS:

Cellulose Acetate Products
Gallic Acid
Hydroquinone
Pyrogallic Acid
Silver Nitrate

•

Research Organic Chemicals

EASTMAN COTTON SOLUTIONS are prepared from high grade nitrated cottons and are available in a wide range of viscosities, solid contents and solvent combinations.

EASTMAN FILM SOLUTIONS are especially suitable for use in the manufacture of artificial leathers, waterproof fabrics, lacquers and similar products.

EASTMAN KODALOID is a high quality nitrocellulose sheet of exceptional clarity. Standard gauges are supplied in continuous lengths or cut-to-size sheets.

Information and quotations on any of these products will be furnished on request. Eastman Kodak Co., *Chemical Sales Division*, Rochester, N. Y.

NRA CODE

EASTMAN TESTED CHEMICALS

SHERKA

MENTHOL CRYSTALS
SYNTHETIC

THYMOL U.S.P.
CRYSTALS

MUSTARD OIL
ARTIFICIAL U.S.P.

CAMPHOR
SYNTHETIC

UREA

TERPIN HYDRATE U.S.P.

TERPINEOL

SHERKA CHEMICAL CO., INC.
86 ORANGE STREET, BLOOMFIELD, N.J.
Telephone Bloomfield 2-6800

Industry's Recovery Plan

What was spoken of in more than one direction as the largest gathering of American industrial leaders to assemble in years, met at the Waldorf-Astoria, Dec. 5-6 at the joint convention of the National Association of Manufacturers and the Congress of American Industry. Business leaders, accused of criticizing without offering a definite plan of action for recovery, countered with a formal platform. Chemical industry's spokesman in national affairs, President William B. Bell of the Chemical Alliance, played a very prominent part in the drafting of proposals offered on the floor for discussion.

In its original form, platform urged a program of orthodox economic measures as a basis for cooperation by business and industry with government in the recovery program—a balanced Federal budget, return to the gold standard, return of business to private enterprise as opposed to governmental control and other points.

A Modified NRA

After a 2 day discussion the original planks were retained as drafted, with a few minor changes, but in addition, recommendations were adopted suggesting an extension of a modified NRA for one year and appointment by President Roosevelt of a general committee specifically to plan a national program of unemployment insurance, old-age pensions and other social security measures.

Prominent Chemical Leaders

Several leaders in the chemical field are prominent in affairs of the National Association of Manufacturers. On the board of directors, in addition to Mr. Bell, are H. L. Derby, president American Cyanamid & Chemical; George W. Merck, president, Merck & Co.; and F. W. Lovejoy, president, Eastman Kodak. On the Committee on Future Relations of Government to Industry, in addition to Mr. Bell are: E. M. Allen, president, Mathieson; E. V. O'Daniel, vice-president, American Cyanamid. T. M. Girdler, chairman, of Republic Steel, also heads Girdler Corp., industrial gases.

'33 Natural Gas

Marketed production of natural gas, which increased steadily through '30 but declined in '31 and '32, showed little change in '33 when compared with '32. Total output for '33 was 1,555,474,000,000 cu. ft, or only 516,000,000 cu. ft. less than total for '32. Decrease in output between '30 and '33 was due primarily to curtailment of industrial activity with consumption by domestic and commercial users increasing steadily. In '33, however, domestic and commercial consumption showed its first decrease while consumption for industrial purposes showed a material gain. Complete statistics are available in Mineral Markets Reports, No. 323, Bureau of Mines, Washington.

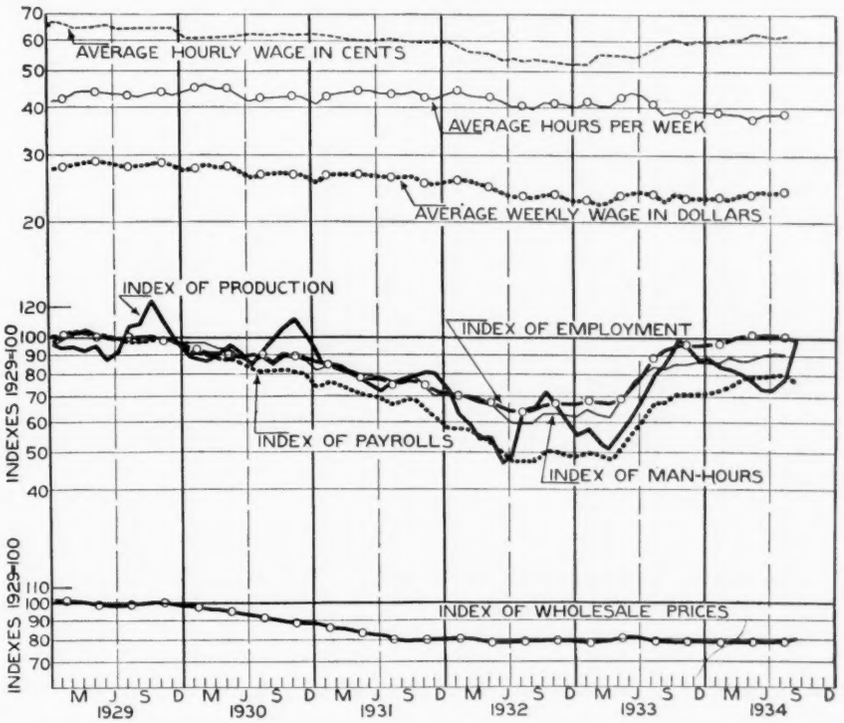
China Clay Booklet

"Kaolin and China Clays in the Pacific Northwest" is the subject of a bulletin by Hewitt Wilson, issued by the University of Washington Engineering Experiment Station, Seattle, Bulletin 76.

Washington

¶NRA Studies Chemical Industry Statistics—Garvan Attacks Trade Agreements—Du Pont Suggests Elimination of Excessive War Profits—

A picture of the basic trends in chemical manufacturing industry is given by 4 series in the center of a chart prepared by the NRA Research and Planning Division and published in the Nov. 26th edition of *The Blue Eagle*. Operating indexes are expressed as percentages of their respective averages in '29. Employment and pay-roll indexes were obtained by combining the Bureau of Labor Statistics indexes for chemicals and explosives weighted in accordance with their importance in the industry. Man-hours index was computed by multiplying the estimated number employed by the average hours worked per week and reducing the result to an index number, or relative, with '29 as the base year. Data compiled by the Bureau of the Census and the Survey of Current Business were used for the construction of the Production Index.



Average number employed in the chemical manufacturing industry during the last 6 months has been approximately the same as the average number employed in 1929, and about 60% greater than at the depression low of August '32. Man-hours during the last few months have been approximately 90% of the '29 average and about 50% above the '32 low. Beginning in April '33, the index of man-hours rose as rapidly as the index of employment until August '33, after which the employment index outstripped the index of man-hours, because of the reduction in the number of hours. Currently the spread between the 2 indexes is about 10%, and indicates the extent to which work has been distributed in accordance with the policies of the President's Reemployment Agreement and the Code for the industry.

Chemical Payrolls

Pay-roll index is still around 20% below '29 although it has shown the same remarkable improvement displayed by the employment and man-hour indexes. It should be noted that the aggregate purchasing power of labor in the chemical manufacturing industry, as represented by total pay rolls is approximately the same as the purchasing power of '29 pay rolls, since the cost of living declined somewhat over 20%. Index of production shown on the chart is a composite which covers less than 10% of the value of production under the Code and is heavily weighted with alcohols, sulfuric acids, and explosives. Some of the defects in the index have been eliminated by an adjustment to the total production of chemicals in '31 as obtained from census data. Items included in the index have a seasonal movement different from total chemical production largely because of the fall expansion in production of sulfuric for fertilizers, in alcohols for "antifreeze solutions" and in explosives for coal mining. Production, as indicated by the index, is participating in the usual

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fall upswing, and in September '34 was not only higher than in any other September since '30, but also higher than any month since then with the exception of October, '33. In the absence of more complete and diversified data for the various branches of the chemical manufacturing industry, the index of man-hours should be considered as the closest available estimate of the trend of production for short-term periods.

Upper section of the chart shows the average hour wage, the average hours per week, and the average weekly wage. Currently these are obtained by combining Bureau of Labor Statistics data for chemicals and explosives. Before '32, National Industrial Conference Board data were used (in the absence of Bureau of Labor Statistics' figures) after some minor adjustments. Average hours worked per week were derived by dividing the average weekly wage by the average hourly wage. Hourly wage rate declined steadily until February '33 when it reached the low of 52c per hour. This movement was then reversed as average hourly wages began a more or less steady increase to 62c—only 3c below the '29 average. In spite of the drop in average hours per week the average weekly wage increased from less than $22.50 in the early spring of '33 to $24 in August '34.

An index of wholesale prices of 52 chemicals which is compiled by the Bureau of Labor Statistics is shown in the lower section of the chart. For the period of 4 or 5 years ending with '29, chemical prices were remarkably stable at approximately the '29 levels. After a slow decline ending in the autumn of '31, prices reached a level about 20% below '29. This level has been maintained until the present time.

Trade Agreements

Francis P. Garvan, militant Chemical Foundation head and sworn arch foe of European chemical cartels, fired a broadside at trade reciprocity with "To fool with the chemical tariff schedule would be treason," summarizing his testimony before the Senatorial Committee investigating proposed trade agreement with Belgium.

With characteristic directness, Mr. Garvan warned inquiring Senators that Belgium is a party to the European cartel; that any concessions made to that country could easily be taken advantage of by other cartel members by erecting a plant in Belgium and exporting to the U. S. with that country as the coutnry of origin.

"We must," insisted Mr. Garvan, "keep up with the chemical knowledge of the world if we are to be sure of a national defense in the next war. It is more of a war of necessity now. The competition that we must face is the world combined."*

* Chemical producers consider most important (because of dye situation) hearing, Dec. 17, on proposed Swiss agreement.

Potash Producers Protest

American potash producers ask, in a brief submitted Nov. 12 at a hearing on a proposed trade agreement with Spain, that the U. S. refrain from entering into any agreement whereby we agree to keep Spanish potash on the free list. Document points out that possible future aid through section 3-e of NRA would be closed to potash producers. National Barytes Association asks that Spain be asked to agree to a higher import duty on Spanish barytes. Association spokesmen insist that barytes miners in Missouri are starving because of this competition.

Anti-Freeze Alcohol

Commissioner of Internal Revenue rules that when anti-freeze alcohol is sold under a trade or brand name certain approved substances must be added so that the character of the product is changed and it will not constitute a sale of an approved anti-freeze formula under a trade name. Sale of approved alcoholic anti-freeze solutions under a proprietary name, free of completely denatured alcohol restrictions, must be limited to drums and cans.

NRA News

NRA approves amendment to the hardwood distillation code providing for an open-price filing system for anti-freeze methanol, similar to provisions in the code for the industrial alcohol industry, thus bringing both under identical provisions. Arrangements are made for interchange of anti-freeze prices between the industries.

Code authorities for the paint, varnish and lacquer industry and the bleached shellac industry are asking NRA for interpretations of certain provisions of both codes that appear to overlap and which are causing some confusion.

Code authority for the sulfonated oil industry asks approval of a $20,000 budget.

NRA recognizes memberships for the code authority of the chemical engineering equipment industry. For complete list see C. I., Nov., p. 435.

Munitions

Lammot du Pont, writing in his executive capacity of president of the du Pont Co., urges in the event of war elimination

PRESIDENT LAMMOT DU PONT
Offers a constructive plan in war profits, but opposes government monoply.

of all excessive profits for both corporations and individuals and drastic governmental control over export of munitions to prevent abuses, but insists that a government monopoly of munitions making would weaken the national defense and lead to a number of other mistakes. Included in his pertinent statistics he reports that over 25,000 U. S. plants were engaged in munitions making in the last war and that establishment of a government monopoly would necessitate expansion of the government's arsenals 20 times.

Nye Is Critical

Senate's chief munitions investigator, Senator Nye (R.-N. D.) was largely critical of Mr. du Pont's suggestions and issued a statement to the effect that the du Pont proposals were just a "sop" to combat the movement for a government monopoly. Emphasizing, however, that he was not impugning the sincerity of the du Pont proposals, he said that the letter had in his opinion failed to prove that a government monopoly would injure national defense.

First N. Y. Exposition of Molded Plastics is being conducted by *Modern Plastics*, 425 4th Ave., N. Y. City.

COMING EVENTS

National Association of Insecticide & Disinfectant Mfrs., Hotel McAlpin, N. Y. City, Dec. 10-11, John H. Wright, secretary, Chrysler Bldg., N. Y. City.

Ceramic Association of N. J., Ceramics Bldg., Rutgers, New Brunswick, N. J., Dec. 14.

American Association for The Advancement of Science, Schenley Hotel, Pittsburgh, Dec. 27-Jan. 2.

American Water Works Association, N. Y. Section, New Yorker, Dec. 27.

Nat'l Association of Dyers & Cleaners, convention and exposition, Book-Cadillac, Detroit, Jan. 29-31

Southwest Water Works Association, Hotel Driskell, Austin, Texas.

N. Y. State Sewage Works Association, McAlpin, N. Y. City, Jan. 15.

Third National Knitwear Industrial Exposition, Grand Central Palace, N. Y. City, A. B. Coffman, Manager, Feb. 11.

American Ceramic Society, Hotel Statler, Buffalo, Feb. 17-22, '35.

Technical Association of the Pulp & Paper Industry, Waldorf-Astoria, N. Y. City, Feb. 18-21, R. G. Macdonald, secretary, 122 E. 42nd st., N. Y. City.

Federated Textile Industries, Inc., annual dinner, Waldorf, Feb. 28.

Electrochemical Society, New Orleans, Mar. 21-23.

A. C. S., 89th meeting, N. Y. City, Apr. 22-27.

American Water Works Association, annual meeting, Netherland Plaza, Cincinnati, May 6-10.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 2-7.

LOCAL TO NEW YORK*

Dec. 14, American Institute of Chemists.

Dec. 21, Electrochemical Society in charge of meeting of 4 technical societies.

Jan. 11, '35, Society of Chemical Industry in charge of meeting 4 technical societies, Perkin Medal awarded.

Secretaries of Chemical Associations and Groups allied to chemistry (also the process industries) are urged to make use of this column.

* Chemist Club unless otherwise stated.

Obituaries

¶George E. Fisher; Dr. Karl von Linde; Dr. Eric von Gebaur-Fulnegg; George Browne Cowper—

George E. Fisher, 70, a retired Grasselli vice-president, on Nov. 21. His father was prominently connected with the development of the first oil fields to be worked in this country in the vicinity of Titusville, Pa. Sulfuric acid was a necessity and Grasselli established an acid works there. At the age of 21 (in 1885) Mr. Fisher joined the chemical company and arose steadily, going from one plant to another, until in 1896 he became superintendent of Grasselli's plant at East Chicago, Ind. In 1900 he was brought to Cleveland headquarters in the operating dept. By 1910 he had become a director, and in '14 was made vice-president. Meanwhile he became known in chemical circles as an outstanding expert both in his knowledge of chemical manufacture, and as an executive. Since his retirement, he had spent his winters in California and Hawaii.

Dr. Karl von Linde, 92, developer of the Linde process of producing liquid air (1895), in Munich, Nov. 16. His work made possible manufacture of nitrogen fertilizers, and gave to industry industrial oxygen. He was honored by the German Government with a "von" for his contributions to science and warfare. He was the "father" of the refrigeration industry and the welding industry. His researches made possible much of our present-day industries and comforts.

Dr. Eric von Gebauer-Fulnegg, 32, of the Gary Laboratories, Ind., accidentally on Nov. 10 inhaling hydrochloric acid. He died at the very moment, it is said, that his 10 years' research for a rubber compound transparent as glass, had ended in success. He was a native of Praha, Czechoslovakia, and taught at Princeton. The newly discovered product is reported to have cost $500,000 in the research stage and to be a satisfactory factory wrapping paper for food and similar industries. Dr. Gustave Egloff, Chicago Chemists' Club president, in talking of his close friend and his work, stated: "The transparent rubber will have great advantages. It is impervious to water and will not decompose over a long period of time. The invention is practically complete."

George Browne Cowper, 59, Pure Carbonic vice-president and treasurer, on Nov. 21, following a 5-day illness. Pure Carbonic is an Air Reduction subsidiary and he had served the latter company in various capacities for 18 years.

Phirozshaw Dorabji Saklatvala, 59, oil financier, honorary consul general in N. Y. for Persia for the last 2 years, member of the prominent Tata family of India, on Nov. 23. He is survived by his widow, 3 brothers, including Dr. Beram Saklatvala, Vanadium Corp. vice-president and one of the most widely known technologists in this country, and a sister.

Other Deaths

Samuel Frazier Pryor, an Air Reduction director, also a member of U.S.I.'s executive committee, on Nov. 17. He was a close associate of the late Percy Rockefeller.

Thomas G. Lee, 56, Armour president, Nov. 6, following 2 weeks' illness with an intestinal disorder.

Ivy Lee, 57, pioneer and most noted public relations counsel, of a brain tumor, Nov. 9. Rockefellers headed a "blue ribbon" list of his clients. Disclosure, recently that he had received $25,000 from the I.G. to improve German-American relations, created a bombshell in a senatorial committee hearing.

Monta C. Burt, 61, president, Gray Chemical, Roulette, Pa., and formerly president, Wood Chemical Institute, Nov. 1, of a heart attack. He initiated an 8-hour day in the wood chemical industry. He became president of Gray Chemical in 1910.

Ernest B. Wright, 46, an official of Continental-Diamond Fibre, at Newark, Del., on Nov. 16.

Col. Charles Edward Terry Lull, 54, C.W.S. officer of the 3rd Corps Area, on Nov. 12, at the Walter Reed Hospital, Washington.

Dr. J. S. Goldbaum, 48, vice-president, Fels & Co., Philadelphia soap manufacturer, on Nov. 5. He was treasurer of the Association of American Soap and Glycerine Producers and aided in writing the soap code.

Robert Mayo Catlin, 81, former N. J. Zinc plant superintendent at Franklin, N. J., on Nov. 22.

Charles A. Jones, 73, founder of Spur, Tex., and formerly with Freeport in N. Y. City, on Nov. 25.

Lyman O. Fiske, well-known in the chemical advertising field, on Nov. 10. Chas. Cooper was one of his accounts in the industrial division of the industry.

J. Frank Crawford, 42, Stein-Hall's Southern representative, at Atlanta on Nov. 26.

Corn Grind

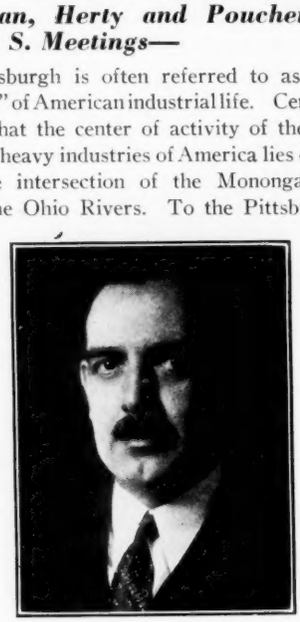
An October corn grind of 5,302,000 bu. is reported through the Corn Industries Research Foundation by 11 refiners manufacturing starches, dextrines, syrups, sugars and other corn derivatives. "This October grind," reports the Foundation, "is some 9% below the grind for October '33 and brings total grind for the first 10 months of '34 to 53,478,000 bu. approximately 9% below the 10 months' total for the corresponding period of '33.

"Although October '34 figure rose somewhat above that of September '34 increase was less than the usual seasonal rise and was some 800,000 bu. less than the increase of October over September in '33."

Associations

¶Chemical Engineers Meet at Pittsburgh—Textile Chemists in N. Y.—S. O. C. M. A. Honors Garvan, Herty and Poucher—A. C. S. Meetings—

Pittsburgh is often referred to as the "heart" of American industrial life. Certain it is that the center of activity of the so-called heavy industries of America lies close to the intersection of the Monongahela and the Ohio Rivers. To the Pittsburgh



PRESIDENT A. E. MARSHALL
Leads "Chem. Engineers" on to Pittsburgh for a highly successful meeting.

district last month (Nov. 15-17) repaired members of the American Institute of Chemical Engineers for their 27th annual meeting to listen to a distinguished group of scientists and engineers and to inspect the hub of the country's steel industry. But the members soon discovered that steel is not the only field in which Pittsburgh excels. Huge zinc oxide, sulfuric acid, aluminum, plastics, coal tar chemicals production plants were discovered in the inspection tour. Nor can pure or applied research be forgotten for a moment in Pittsburgh with Mellon Institute and the New Kensington Laboratories of the Aluminum Co. of America close at hand.

With Dr. A. E. Marshall, heavy set, dark, deep voiced, English by birth, expert on sulfuric acid and glass, noted chemical consultant, presiding, members heard successively Dr. John C. Hostetter, Corning Glass' director of research, relate the absorbing story of making astronomical telescopes; William C. Geer tell how science has overcome the danger of ice forming on the wings of airplanes; Dr. Francis S. Frary (Aluminum Co. research head) explain the peculiar properties of aluminum that makes it a potent weapon in the chemical engineer's war on corrosion; and D. Ernst Berl's startling revelations concerning the possibility of increasing sulfuric production from 3,000 to 13,000 fold by employing new operating

technique. These and other papers of equal importance, exciting inspection trips and a banquet at which Arthur Brisbane was the principal speaker left not a dull, unoccupied moment for the members attending the meeting.

A. A. T. C & C. at N. Y.

American Association of Textile Colorists and Chemists' 14th annual meeting at the New Yorker in N. Y. City, Dec. 7-8 attracted a large enthusiastic group who listened to G. M. Kline, W. D. Appel, R. T. Mease and Milton Harris of the U. S. Bureau of Standards, R. E. Rose and N. R. Vieira of du Pont, F. L. LaQue of International Nickel, W. L. Savell of Mathieson Alkali, David Scott of Henry L. Scott Co., A. E. Sampson, Calco Chemical, Prof. E. R. Schwarz of M. I. T., Prof. H. A. Neville, Lehigh University, A. R. Thompson of the Ciba Co. and Prof. Charles B. Ordway of Alabama Polytechnic. The "Rayon Symposium" was well attended. Speakers included Dr. H. D. W. Smith of the A. M. Tenney Associates; Ernest N. Benzing, American Bemberg, and J. B. Quig, du Pont Rayon.

Technologists' Dinner

Association of Textile Laboratories and Technologists celebrated its first anniversary with a dinner and dance on Nov. 7 in the ballroom of the Imperial Hotel, in N. Y. City. Honor guest of the evening was Takeshiga Ishiguro, director of the Japanese Government Raw Silk Intelligence Bureau. A new film entitled "From Seed to Silk" was shown. Speakers at the gala night were Paolino Gerli, vice-president of E. Gerli & Co. and president of International Silk Guild, also R. D. Jenkins of the Guild.

Denny Before The Salesmen

Salesmens' Association of the American Chemical industry will have as guest speaker at the 2nd in a series of informal luncheon talks by leading executives of the industry Henry Denny, manager of the sales development department of Commercial Solvents. The date is Dec. 13 and the place, The Chemists' Club. At the first meeting, H. L. Derby, president, American Cyanamid & Chemical, talked before a large and enthusiastic audience. Mr. Derby was introduced by Williams Haynes, publisher of CHEMICAL INDUSTRIES. Other speakers are being arranged for in the series. The luncheon meetings are closed to members of the Association.

The annual Christmas party is scheduled for Dec. 27. In view of the large turn out at the affair last year early reservations are suggested. Final plans will be announced by letter. As usual, guests will be in order.

Saunders Medal

Saunders Medal of the American Institute of Mining & Metallurgical Engineers is awarded to James MacNaughton, president, Calumet & Hecla. Presentation will be made at the February meeting in N. Y. City.

A. C. S. Sections

Philadelphia section listens to Prof. R. Adams Dutcher on "Some Observations on Biochemical Research in Germany and Neighboring Countries."

Dr. Irvine W. Grote, University of Chattanooga, explains "The Tennessee Valley and Chemical Expansion" to the Cincinnati section.

Francis P. Garvan, Chemical Foundation head, and Dr. Robert R. Williams, chemical director, Bell Telephone Laboratories, address the Delaware group.

Dr. Heinz Rosenberger, Rockefeller Institute, and William W. Winship, manager, Thermal Syndicate, are November speakers before the joint meeting of the Societe de Chimie Industrielle; N. Y. section of the A. C. S.; the American Institute of Chemists; American Electrochemical Society's N. Y. section; and the Society of Chemical Industry (American group).

Dr. Fred. Allison, Alabama Poly, is the principal speaker at the November meeting of the Virginia section, held at Charlottesville.

Midland section was unusually fortunate in securing Professor Vladimir N. Ipatieff, famous Russian chemist. He lectured on "Theoretical Principles of Catalytic Reactions" at the educational building of Dow Chemical, Dec. 3. Professor Ipatieff, now 67, is in this country as a research associate with Universal Oil Products Co. of Chicago. Midland lecture was his first appearance before an American audience.

American Institute Meetings

Dr. Karl T. Compton, M.I.T. president; Dr. Walter Rautenstrauch, professor of industrial engineering at Columbia; and Dr. M. L. Crossley, Calco Chemical chief chemist, are the speakers scheduled for the Science Symposium of The American Institute on Dec. 14. Admission is without charge, but by ticket only which may be obtained from the Institute, 60 E. 42 st., N. Y. City.

At the "Synthetics Symposium" held Nov. 27 speakers and their subjects were: Gordon Brown, Bakelite vice-president, on synthetic plastics; Stanley B. Hunt, noted Tvbize economist and statistician, on synthetic yarns; Dr. Eric Kunz, Givaudan-Delawanna vice-president, on perfumes; and Dr. Walter S. Landis, Cyanamid vice-president, on synthetic fertilizers. Speakers were entertained at dinner at the Chemists' Club by Williams Haynes, publisher of CHEMICAL INDUSTRIES, who acted as chairman of the meeting.

Institute In Textile Research

Francis P. Garvan, president, U. S. Institute for Textile Research, and Dr. Charles Herty headed the list of distinguished speakers at the fifth annual meeting of the Institute held in N. Y. City last month.

Foreign

¶British Workers Agree On Terms—German Domestic Potash Prices Reduced—Japanese Plants Suffer Injury From Typhoons—

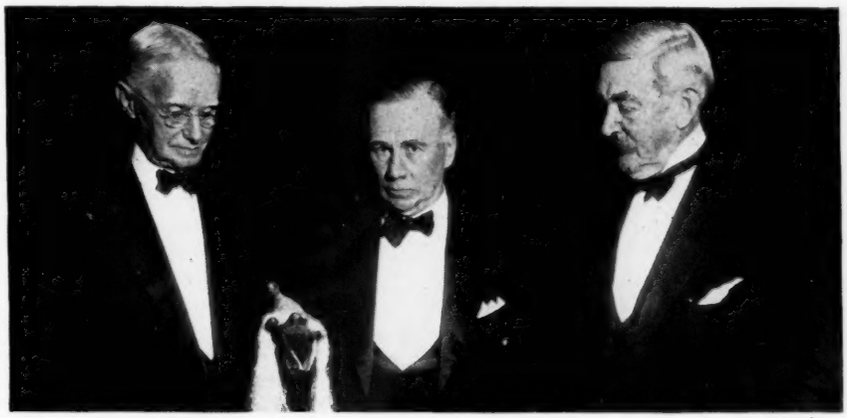
National Union of General and Municipal Workers accepts offer of the Chemical Employers' Association to establish a base rate of 1s., 5⅛d. (24¼c) per hour for day laborers, and 1s. 2⅛d. (28¼c) per hour for shift workers, and a 5% increase for piece workers, with proportionate increases to women and youths. I. C. I. workers have been receiving pay on this basis for sometime.

I. C. I. is said to have offered to construct a $30,000,000 hydrogenation plant near the Victoria lignite deposits in Australia.

Ford's attempt to grow a soybean crop in England has been successful.

British August sodium bichromate import figures show that Russia is enjoying the bulk of this business.

German Potash Syndicate is reducing domestic prices by 11 to 38% to stimulate



—A. P.

S. O. C. M. A. honors "The Three Musketeers" of the chemical industry, Garvan (center), Herty (left), and Poucher (right). Mr. Garvan holds the first skein of rayon made from slash pine at Dr. Herty's Savannah laboratories.

domestic consumption. Potash fertilizer grades now number 5. Exports are unsatisfactory. For first 8 months, value declines to Rm. 12,351,000, compared with Rm. 13,066,000 in corresponding '33 period.

Ruhrgas A. G. produced 6,671 tons of sulfur by gas purifying processes. Annual production by this means is estimated at between 10,000 and 12,000 tons, as against annual consumption of 40,000 to 50,000 tons.

A new sales bureau to handle staple-fiber products of the German Dye Trust and the J. P. Bemberg Co., is established in Berlin. Fiber, produced by a copper-oxide process, is to be used mainly for admixture with wool for clothing material.

Bemberg and I. G. found an organization "Cuprama—Spinnfaser, Gesellschaft" with headquarters in Berlin, and a capitalization of 50,000 Rm. Company will manufacture "Cuprama" fiber, which is a spun rayon made from cuprammonium yarn on the order of vistra and spun rayon. This is another step to be intended to make Germany independent from foreign textile raw materials, especially from raw wool.

Sixth volume of the "Dechema-Monographs" series is published containing lectures delivered at the conference of the German Society of Chemical Engineers at Wuerzburg in '33.

At the recent annual meeting of Ruhr-Chemie A.G., Oberhausen-Holten, reports *The Petroleum Times* (British), it was stated that, in view of the difficulties in the nitrogen market, company had decided some time ago to participate in the Government plans for increasing home production of motor fuels. First step was to examine the I.G. process for the direct hydrogenation of coal (a process successful on a big scale so far only with lignite), but this process will not be taken up until further tests have been made. Company has, on the other hand, taken over a process developed in the Ruhr district by Professor Fischer for the synthetic manufacture of oils and petrol from gasified coal, from water-gas. This process has also been operated on a small scale so far, but a larger experimental installation will shortly be available. Ruhr-Chemie A.G. was the first company (2 years ago) to utilize for motor fuel purposes coke-oven gases which become liquid under moderate pressure (Ruhrgasol) and the output is being increased. Company's present difficulties are largely due to "economic nationalism" in other countries—to the efforts of those countries to produce their nitrogen at home.

France

American representatives of the American synthetic nitrate producer are reported in a press dispatch being hopeful of obtaining part of the French business following a reported decision of the Nitrate Commission to increase the quota over the original 100,000 tons decided for '35.

Union Francaise des Producteurs de Benzols (the "Unibenzols") reports world benzol production in '33 of 777,400 tons. Germany produced 253,000; U. S. 206,000; and Great Britain 119,000.

Sales of the French potash industry during recent years were divided as follows:

	(In metric tons of K_2O)			
	1930	1931	1932	1933
France and Colonies..	202,545	183,886	188,590	198,498
Exports ...	222,070	171,678	116,231	132,290
Total ...	424,615	355,564	304,821	330,788

Bauxite deposits are reported discovered at the foot of the Eastern Pyrenees.

French Government sanctions construction of a large experimental coal hydrogenation plant to cost 40,000,000 francs—location, near Calais.

Soviet

Soviet's first benzol plant is reported in operation in the Kusnezk basin.

Borate deposits in West Kasakston are thought to contain a minimum content of 10% boron oxide.

Rich potash ores are reported discovered in the Solikamsk district.

Japan

Recent typhoons in Japan played havoc with many chemical plants and many of them will require major repairs. No estimate has been made of the total damage.

Japanese importation of lacquers in the first 6 months of '34 advanced to 1,414,200 kin (kin = 1.3 lb.) valued at 1,530,672 yen, from 1,246,900 kin valued at 1,428,783 yen for the first half of '33. Varnish imports for similar months were, respectively, 34,744 kin valued at 26,660 yen and 39,687 kin valued at 33,610 yen.

Sakai Kagaku Kogyo K.K. is producing 10 tons of barium hydroxide daily.

Tsurumi Soda's new caustic soda plant is open. Mercury process is used. Output is 2,400 tons annually.

Tokio Methanol K.K.'s production is now at the rate of 18,000 tons annually. Koli K.K. at Osaka is granted state aid to increase formaldehyde capacity.

Dairen Daizu Kogyo K.K. (Manchuria) is extracting soybean oil by the alcohol extraction method.

Italy

Council of National Research and Private Discovery announces a cotton substitute made from wood pulp. U. S. exports $100,000 worth of cotton to Italy.

Foreign Notes

Irish Free State Government is reported looking for new uses for seaweed because of low price of iodine. Sole Spanish producer has ceased also for same reason.

Metallhandels Gesellschaft, Budapest, will make chrome alum and other chrome compounds at the Nagytetenyer Works.

Argentine soda ash imports for first six months of '34 are reported by British *Chemical Age* to be about 14,723 metric tons; U. S. supplying 2,617 tons and United Kingdom, 9,375 tons; balance distributed between Japan, Kenya and Russia.

Norsk Hydro plans production of 500 grams of heavy water daily for sale, according to British *Chemical Age*, at 10 Norwegian kronen per gram, "a considerable reduction over the current American price."

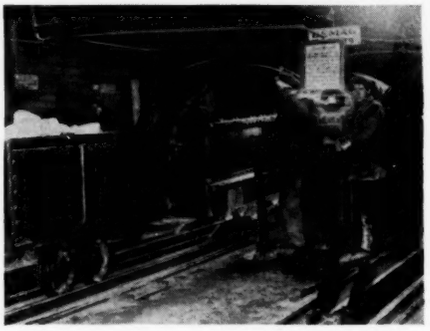
Thallium sulfate and chloride are being made by Polish producer, Slaskie Kopalnie i Cynkownie at Kattowitz-Ligota.

Prague firm of J. Elias is starting manufacture of synthetic resins.

Foreign Trade

¶Soviet Enters World Potash and Phosphate Markets—German Exports In Good Volume—Germans Negotiate With Chile—

Russia is rapidly becoming a very important world factor in potash and phosphate. Steady progress, according to a report in the November issue of the *Economic Review of the Soviet Union*, is being made in the exploitation of the great resources and larger quantities of both are being made available to Soviet farmers as well as providing appreciable quantities for export. The Silikamsk potash deposits in the Urals are said to be the largest in the world. The *Review* states that while the total supply of the rest of

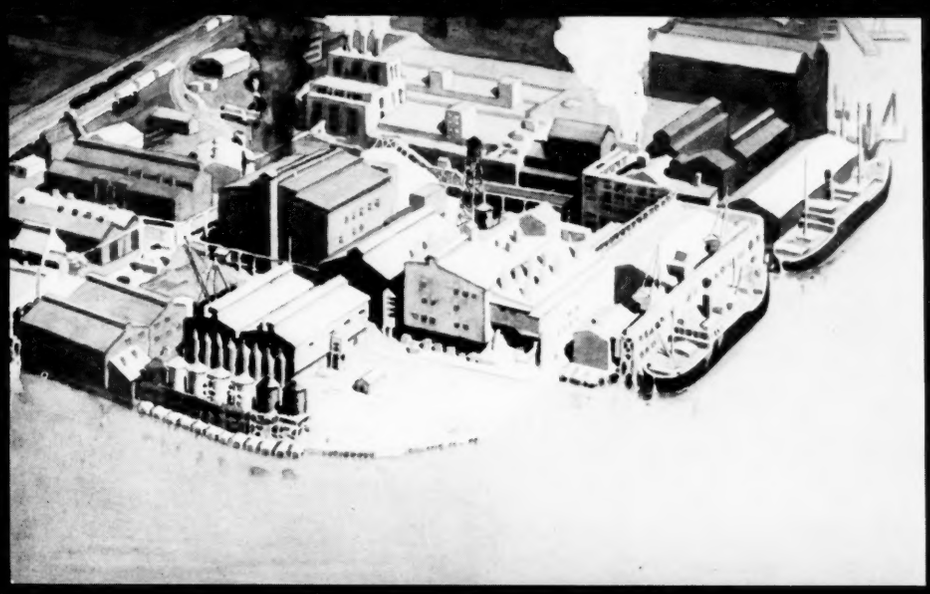


Soviet potash mines are completely mechanized and up-to-date in every way.

the world is estimated at 2½ to 3 billion tons, the explored area in the Silikamsk-Berezniki region is estimated to contain 16 billion tons. Deposits are said to lie only 300 to 350 meters below the surface.

First Silikamsk mine went into operation last year, as well as a plant in which the potassium salts are worked up into finished concentrates. Projected capacity of the mine, 1,500,000 tons a year, 4,500 tons a day, is said to be nearly reached. Construction of a 2nd mine has been started. U. S. in the first 7 months of '34 took 65,700 tons (including 24,900 tons of potassium chloride).

WHY MANY BUYERS ARE TURNING TO AMERICAN CYANAMID *for better service*



A drawing made at one of our plants by D. Douglass

● Every day brings new customers to American Cyanamid. Our business is expanding—and with it our capacity to give better and more complete chemical service.

Buyers have learned that they can depend upon us to supply standard, uniform chemicals *when* and *where* they are needed, without delays. They know that our plants, like the one at tidewater pictured above, are equipped to meet the demand for quick delivery . . . to give prompt attention to all orders.

They know that we are organized in groups specializing in the making of certain products. And because the men in these groups have had years of experience in the handling of these products, buyers know that they can be depended upon to give valuable assistance in solving difficult problems of production. It is this combination of personal attention and large scale organization that gives customers a feeling of confidence and security in placing an order with American Cyanamid.

AMERICAN CYANAMID & CHEMICAL CORPORATION

30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

(over)

Materials for PAINTS, VARNISHES ENAMELS AND LACQUERS

***REZYL RESINS,** *modified glycerol phthalate resins which impart superior adhesion and outdoor durability.*

***TEGLAC RESINS,** *modified glycerol phthalate resins for sanding sealers and gloss interior lacquers.*

PHENAC AND AKCO RESINS, *modified phenolformaldehyde resins for the manufacture of quick drying, waterproof varnishes.*

ESTER GUM, *a modified natural resin, pale, hard and neutral for economical formulations of both varnishes and lacquers.*

FOSSIL RESINS, *all types and grades to meet every varnish and lacquer requirement.*

NITROCELLULOSE, *for lacquers and plastics. Available in all standard viscosities. Readily soluble and free from deleterious impurities.*

DIBUTYL PHTHALATE, *a truly water-white product, free from odor, pure, and recommended for economical formulation. Valuable as a plasticizer for lacquers, cements, molding compounds and dopes made from nitrocellulose ethers, or resins — or as a non-volatile, high-strength solvent for printing inks, dyes, perfumes and insecticides.*

ETHYL LACTATE, *a high-boiling solvent of exceptional strength for both nitrocellulose and cellulose acetate lacquers. Used to prevent blushing and to develop finishes of unusual smoothness and gloss.*

DRIERS, *oil soluble linoleates and resinates of cobalt, manganese and lead in paste and solid forms to accelerate the drying of paints, varnishes and synthetic finishes.*

METALLIC SOAPS, *in wide variety for use as pigments, or flatting agents, for waterproofing and many other purposes.*

PIGMENTS, *chemical and mineral colors for all types of paint products. Ochre, Sienna, Pure Zinc Oxide, Litharge, Lithopone: Mabelite Pigment No. 300 for metal, concrete and road surfaces, protects against corrosion and electrolysis, inhibits rust.*

WAXES, *all grades for varnish remover, polishes, waterproofing compounds and other paint specialties.*

**Registered trade mark of the Rezyl Corporation. These products are protected by U. S. Patents, including license under Patents No. 1893873 and No. 1893874.*

AMERICAN CYANAMID & CHEMICAL CORPORATION

THIRTY ROCKEFELLER PLAZA, NEW YORK

(over)

Similar developments are taking place at Khibini, on the Kola peninsula, where the apatite (phosphate) deposits are located. Production has increased from 387,000 tons in '32 to 687,000 tons in '33 and further increases are being made this year. Being hard and dense, with little moisture, and almost no sulfate, it is being exported at present largely for metallurgical purposes, but the use for agricultural purposes is constantly growing.

German Foreign Trade

German chemical and allied products exports during the first 6 months of '34 held up well, statistics show, despite the acute exchange shortage, contracting 3% from the corresponding '33 period while the decline in all commodities reached 12%. Total exports of chemicals and allied products, during the first half of the current year were valued at 333,500,000 marks, accounting for 16% of Germany's total trade compared with 343,900,000 marks for the first half of '33 when exports of these products accounted for 14½% of the total. During the first half of '32 only 12.8% of Germany's exports consisted of chemicals.

Principal items making up Germany's chemical and allied products exports were heavy chemicals, 77,500,000 Rm.; dyestuffs and intermediates, 73,100,000; medicinal products, 50,600,000; nitrogen fertilizers, 26,700,000; and mineral pigments and colors, 25,800,000. These groups accounted for 76% of the country's total exports of chemicals and allied products. Other items of importance on the export list included photographic chemicals, explosives, paints and lacquers, and essential oils.

European countries continued the best markets for German chemicals, taking 207,500,000 Rm. worth in the first half of the year, compared with 212,600,000 for the corresponding period of last year, and accounted for 61.8 and 62.2%, respectively, of chemical exports to all countries during these periods. Latin American countries took 30,300,000 Rm. worth during the first half of '34, and China, Japan, and British India absorbed more than 15,000,000 worth each.

Germany's chemical exports to the U. S. during the first half of '34 were valued at 19,200,00 Rm. against 21,300,000 for the corresponding period last year, and constituted 5.8 and 6.2%, respectively, of that country's chemical and allied products exports to all countries.

Argentine Casein

Argentine casein exports for the first 9 months of '34 declined 15%, from 17,699 tons (metric) in the 9-months period of '33 to 15,017 tons this year to the end of September. Germany has been the most important market for Argentine casein in the current year, accounting for 37% of total exports and was followed by England with 20%; Netherlands, 10%; and Japan, 7%. Other important markets have been Finland, Spain, Italy, U. S., Sweden, and Belgium. During 1934, casein shipments increased to England, Netherlands and Finland, while decreased exports were registered in the case of Germany, Japan, Italy and the U. S., greatest decrease being to the last-named market.

Official Argentine statistics covering the first 9 months of this year show that casein exports were valued at 6,544,059 paper pesos compared with 5,002,113 paper pesos exported in the first 9 months of '33. Official average export value per metric ton of casein during the '34 period was 438.08 paper pesos compared with 288.27 during the first 9 months of '33, the former figure showing an increase of 52%.

German - Chilean Agreement

German and Chilean financial experts are meeting at Santiago in an effort to stimulate trade between the countries. Nitrate will, of course, play an important part in the negotiations.

According to recent reports, agreement provides for bartering 80,000 tons of nitrate during the year ending June 30, '35, for German machinery and to release a further portion of the German credits frozen in Chile.

And, In Addition

German tartaric acid exports decline, largely the result of lessened shipments to the U. S. In '31 exports to the U. S. totalled 933 tons, as against only 253 in '33, and only 18 tons in the first 8 months of '34.

Union of South Africa holds glucose from the U. S. is "dumped" and subject to duty equal to the difference between the export price and the domestic value plus charge for loading.

Personnel

¶*Grasselli and Standard Oil Development Announce Important Changes*

Grasselli reorganizes its new products division, which now will be known as the new products department and which will consist of an industrial chemicals division and a pest control division. Headquarters of the new products dept. will be in the Grasselli offices at Cleveland. Department will continue to operate as a unit of the chemical dept., which is under the direction of E. A. Taylor. E. B. Alvord will have charge of the new products dept. Direction of the pest control division will be in the hands of Dr. W. H. Tisdale, and direction of the industrial chemicals division will be in the hands of H. S. Colton.

Pest control division constitutes a consolidation of the interests of the du Pont Co. in chemical and biological research and technical sales service in the development of insecticides, fungicides, weed killers, rodent poisons, and other protective agents for agricultural and commercial use. A staff of chemists, toxicologists, entomologists, plant pathologists, and horticulturists will be responsible for a well balanced program of investigations in these fields.

Dr. H. F. Dietz will have charge of field investigations in entomology. F. T. Evans will have charge of the commercial development of agricultural products. C. E. Graves will be responsible for the commercial development of pest control products for use in the industrial field. B. A. Weimer will assist Mr. Colton in the industrial chemicals division.

Haslam On Sales Work

Several re-alignments of responsibilities are reported made in Standard Oil Development. Dr. R. T. Haslam, vice-president and general manager, will devote more time to the sales angle; R. P. Russell, general manager of the development dept. and of the Hydro Engineering and Chemical Co., is now general manager of Standard Oil Development and has been elected a vice-president; W. R. Carlisle, vice-president of Standard-I. G. and Dr. W. V. Hanks, head of the technical information unit of the development company and secretary of the technical committee, are now in London and will engage in development work in Europe; W. Carl Winning is transferred from Bayway to N. Y. City to take Dr. Hanks' work. Dr. G. M. Maverick also comes to N. Y. and will take over many of the activities formerly directed by Mr. Russell.

Additional Changes

Paul D. Merica, assistant to International Nickel's president, elected a director to fill a vacancy.

Dr. G. M. Mortati is now with Wishnick-Tumpeer in charge of the foreign department. He was for many years vice-president of the Superfos Co.

E. P. Polushkin, former metallography instructor at Columbia's School of Mines, is now with Lucius Pitkin, Inc., Brooklyn, as associate metallurgist and consultant.

Clark C. Heritage is now technical director of Oxford Paper. He is president of Tappi.

J. T. Shillingford, formerly with du Pont Cellophane, is now with Whitehead Metal Products, an International Nickel subsidiary.

K. E. Buff resigns from Institute of Paper Chemistry to become chief chemist of Owens-Illinois Glass.

Carl Apelgren is now chief chemist for St. Regis Paper.

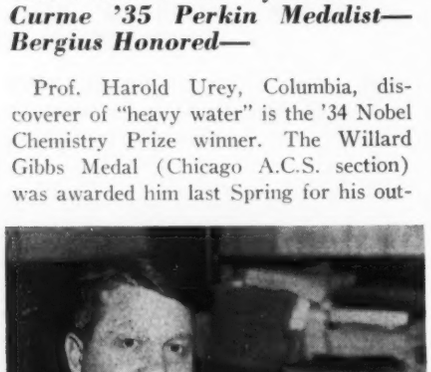
News Oddity

Jack Wyatt, Amarillo city chemist, is cooperating with Federal tooth stain experts on problem of mottled teeth in the school children. Fluorine in drinking water is suspected.

Personal

¶Columbia's Urey Nobel Prize Winner—Metzger Receives Chemical Industry Medal—Curme '35 Perkin Medalist—Bergius Honored—

Prof. Harold Urey, Columbia, discoverer of "heavy water" is the '34 Nobel Chemistry Prize winner. The Willard Gibbs Medal (Chicago A.C.S. section) was awarded him last Spring for his outstanding achievements in this field and his work is hailed by scientists as ranking among the great developments of modern science. Five other scientists have won both the Willard Gibbs Medal and the Nobel Prize: Mme. Marie Curie, Svante Arrhenius, Prof. Richard Willstaetter, Prof. T. W. Richards, and Dr. Irving Langmuir.



PROFESSOR HAROLD UREY
"I am fortunate in doing exactly what I want to do."

Dr. Urey, who once again brings the Nobel Prize to this country, is but 41 years old. In his Willard Gibbs Medal acceptance speech, he predicted that within 10 years science would probably solve the mysteries of the atomic nucleus. He is a product of the middle-west; graduated from the University of Montana in '17 with a B.S. degree in zoology. Turning to the chemical field, he received his Ph.D from University of California in '23. Then followed 2 years' work at Copenhagen under Prof. Niels Bohr and an appointment to Columbia's chemical staff. Cornered in his laboratory and asked to comment on the news from Stockholm, he appeared embarrassed for a moment and then quickly replied, "I am fortunate in doing exactly what I want to do."

Asked to speak over an NBC network, he reported that 99.9% pure heavy water was worth $75,000 a gal., adding that he doubted "whether a gallon has been made by all the research workers together." Dr. Urey will receive the Nobel Prize from the hands of the King of Sweden sometime next Spring.

Metzger On Rare Gases

Dr. Floyd J. Metzger, Air Reduction's vice-president and director of research and one of the country's outstanding technologists, received the '34 Chemical Industry Medal from the hands of Dr. Arthur D. Little on Nov. 9, at the Chemists' Club in N. Y. City, and heard his former close associate at Columbia, Dr. M. C. Whitaker (now a Cyanamid vice-president) acclaim him as a leader in industrial research whose scientific and technical achievements are "the foundation stones on which have been built far-reaching and important industrial developments."

Responding, Dr. Metzger spoke on "Traces from Tons" a dramatic retelling of the battle to win industrial chemicals from the air, which began modestly in the company's laboratory in Jersey City 15 years ago, later moved to more spacious quarters in Elizabethport, N. J., and has given to the world the rare gases of the air and numerous industrial uses for them. In '17, Dr. Metzger set out from Columbia to master the air. Presentation of the coveted medal of the Society of Chemical Industry was public acknowledgment by Dr. Metzger's scientific contemporaries of his complete success in his chosen field of endeavor.

Dr. Metzger was born in Akron, in 1877; graduated from Buchtel College (now University of Akron) in '99; received his doctor's degree from Columbia in '02; taught at Columbia until '17; worked there under the pioneer of industrial chemistry in this country, Prof. C. F. Chandler; became manager of chemical development for Air Reduction in '17; and was elected a vice-president in '22. Since '31 he has also directed U. S. I.'s research.

Organic Synthesis Did It

George O. Curme, Carbide & Carbon Chemical's vice-president, will receive the Perkin Medal for '35 at the Chemists' Club, N. Y. City on Jan. 11. Award is made in recognition of Dr. Curme's outstanding contributions to the field of organic synthesis.

Bergius' English Honors

Dr. F. K. R. Bergius is the '34 Melchett medalist, one more recognition of his outstanding work in the field of hydrogenation. Friedrich Karl Rudolf Bergius' chemical training might be said to have commenced at the knees of one of his parents for he started in his father's chemical works at a very early age. His chemical studies began at Breslau in '03; in '07 he became a lecturer at Leipzig and in '09 he joined the Haber Institute in Karlsruhe. He soon became interested in reactions under pressure and the following year fitted out a private laboratory at Hanover to continue this work. In '12 and '13 he discovered the hydrogenating effect on coals and oils of hydrogen under pressure and a year later transferred his laboratory to the Essen works of the firm of Theo. Goldschmidt A.-G. The more recent development into the present huge plant scale of the hydrogenation process is well known. His principal interest now lies in the conversion of wood into sugar. He celebrated his 50th birthday late in October.

"The Passing Throng"

Rexford G. Tugwell sidestepped specific queries on his drug-food bills at his first press conference since his return from Europe. Said he: "I'll support any bills agreed upon by Administration leaders."

C. W. Lyons, Lyons Fertilizer, is the new president of the Florida Agricultural Research Institute.

William E. Valliant, Baltimore Fertilizer manufacturer, is on an extensive 2 months' trip, as far west as the Coast.

John Van Nostrand Dorr, 2nd, nephew of Dr. J. V. N. Dorr, is engaged to marry Miss Mary Elizabeth Brigham, daughter of Major General and Mrs. Claude E. Brigham. General Brigham is chief of the Chemical Warfare Service.

Dr. H. T. Hotchkiss, Jr., prominent industrial water treatment authority, lectures before Sigma Delta Epsilon on "The Conditioning of Industrial Water Supplies," at the Cornell Women's Club Rooms in N. Y. City.

J. M. Schantz, Hercules, talks turpentine manufacture to Wilmington Masons, at a luncheon, Nov. 9.

Irenee du Pont discusses the objects of The American Liberty League at a Delaware College alumni banquet on Nov. 24.

James G. Vail, Philadelphia Quartz Chemical director and vice-president, and '33 winner of the Chemical Industry Medal, will lecture on "A Grain of Sand" on the afternoons of Dec. 16, 27 and 28 at the Franklin Institute, Philadelphia.

Rev. J. A. Nieuwland of Notre Dame, famous for his work in synthetic rubber synthesis, traces the development of the practical substitute from experiments of an Englishman 74 years ago, before the Indiana Academy of Science. Rumor has it that Father Nieuwland is shortly to receive one of the most famous in the list of highest chemical medal awards in recognition of his work on synthetic rubber.

Mr. and Mrs. Francis P. Garvan will pass the winter in N. Y. City instead of remaining at their North Shore (Long Island) estate. He has leased an apartment at 960 5th Ave.

William ("Bill") Mueller, Commercial Solvents' general sales manager, has made a complete swing around the mid-western offices and distributors.

Dr. William J. Hale's "The Farm Chemurigic" is reviewed in the Nov. 10th issue of *The Literary Digest*. This most interesting book, written by the well-known Dow Chemical consultant, is receiving wide attention from the lay press.

Dr. Leo H. Baekeland receives a doctorate degree *honoris causa* from the Universite Libre of Brussels, at the centenary celebration of that seat of learning on Nov. 19. He received his Sc.D. from Ghent in '84. He holds a number of honorary degrees and is honorary professor of chemical engineering at Columbia.

Dr. Jacob Goodale Lipman, Dean of Agriculture and Director of the N. J. Agricultural Experiment Station is chosen for his outstanding achievements in the field of agricultural chemistry to give the annual Charles Frederick Chandler Foundation lecture at Columbia, Dec. 14. Dr. Lipman, who will speak on "The Stuff of Life" in Room 309, Havemeyer Hall, will be presented with the Chandler Foundation medal in recognition of his achievements in science.

Peter C. Reilly, president, Reilly Chemical, Indianapolis, is elected to fill one of 4 vacant posts on the board of lay trustees of the University of Notre Dame.

Mr. and Mrs. Charles M. Harris were welcomed to Baltimore at a dinner on Nov. 5 arranged in their honor by C. C. Smith, president of the Potash Co. of America. Mr. Harris, formerly general manager of the company's mines at Carlsbad, N. M., is now associated with Mr. Smith at the executive offices in Baltimore.

H. H. Hammond, manager of sales & engineering for Bailey Meter, was in charge of the company's exhibit at the 11th Exposition of Power and Mechanical Engineering (N. Y. Power Show) at the Grand Central Palace, Dec. 3-8.

Married

Daniel G. Becker, Reichard-Coulson sales representative, and Miss Greta Thysenius of Brooklyn.

Charles H. MacDowell, retired Armour Fertilizer executive, former National Fertilizer Association president and one of the most widely known men in the fertilizer industry, to his former secretary, Miss Claire Anabel Leavitt.

"The Gangplank"

American rubber chemists will warmly greet Prof. E. A. Hauser, noted Vienna rubber chemist, during his tour of this country. He arrives Dec. 10 on the *Majestic* for a stay of approximately 2 months before continuing on to Japan and the Straits Settlements. He is scheduled to speak before several of the rubber groups. He is chief chemist of the Semperit Austro-American Works, Vienna, Austria, and recognized as one of the world's outstanding experts on latex. He has completely recovered from his recent automobile accident. Needless to say there will be a reunion of the American section of the Hauser family group of rubber experts with Dr. E. A. Hauser.

Another rubber chemist of note is about to reach this country. R. O. Bishop of the Rubber Research Institute of Malaya will arrive here in the middle of December for a lecture tour. He will make the Chemists' Club (N. Y.) his headquarters during his stay.

J. F. Speth, president European Naval Stores of Antwerp, Belgium, and vice-president of Antwerp Naval Stores Co., Savannah, is making his biennial visit.

Plastics Consultants

Walker & Gilmore, 30 Church st., N. Y. City, is formed by 2 well-known leaders in the plastics field, George Walker, former sales manager of Garfield Manufacturing Co., and R. C. Gilmore, Jr., president of Plastic Publications, from 1928 to August of this year when *Plastic Products* was sold to the Breskin & Charlton Publishing Corp. Firm will specialize in plastic products, with specific attention to merchandising, product development, research and consulting. Laboratories have been established at Plainfield, N. J., with Manuel R. Ximenez, formerly with Celluloid, in charge.

Companies

¶ Jones Chemical Is Now Io-Dow Chemical — Sipe Co. Moves — Dow Starts Semi-Works Plant—

Dow Chemical's iodine producing subsidiary, Jones Chemical, is now the Io-Dow Chemical Co.

Dowell, Inc., a Dow Chemical subsidiary, specializing in treatment of oil wells to rejuvenate dying ones and to increase flow of others, starts advertising drive in industrial papers, by mail and in newspapers. MacManus, John & Adams, Detroit, is in charge.

Newly Incorporated

New Delaware corporations include: Halifax Explosives, $150,000. 1,000 shares, no par value. (The Corporation Trust Co.).

Address Changes

W. J. Baëza, Industrial Research Co., N. Y. City (surveys, production problems, etc.), is now located in the Chemists Bldg.

James B. Sipe & Co.'s offices are now at the plant. New address is Box 87, South Hills Branch, Pittsburgh.

At The Plants

The old bromine plant near the main offices at the Dow plant which suffered damage from the windstorm during the summer is being rebuilt to fit the present needs. It is being revamped on the exterior and it is expected the work will be completed by Jan. 1. The semi-plant started operation last month.

Niagara Falls chemical plants are well represented in the industrial basketball field. Carbide and Mathieson have entered teams; also Hooker.

E. D. Kingsley, Electro-Bleaching Gas vice-president, spent several days last month at the Niagara Falls plant.

Robert B. McMullin, Niagara Falls, has been awarded a patent on double carbonates of sodium and ammonium and has assigned this to Mathieson.

Work is progressing rapidly on the Apex Gasoline Corp.'s casing-head gas plant at Porter, Mich., and 14 miles of gas line to Dow's plant at Midland are completed.

Standard of N. J. employees at Bayway are said to be considering demands for wage increases.

Equipment Companies

Northern Blower, Cleveland, completes fume recovery equipment at Rochester Smelting & Refining's blast furnaces to recover oxides.

Ertel Engineering, N. Y. City manufacturer of portable mixers, liquid handling equipment, etc., is now located in larger quarters at 120 E. 16th st.

Equipment Co. Personnel

Roger W. Andrews, former assistant to Blaw-Knox's president,, is Combustion Engineering's new western manager.

Robert J. Working is promoted to position of district sales manager in Cincinnati for Republic Steel. .

Chester H. Lehman is appointed vice-president in charge of sales of the Blaw-Knox Co. Mr. Lehman was previously secretary of the company and sales manager. H. B. Loxterman who has been with the company since its organization 28 years ago, succeeds Mr. Lehman as secretary and becomes a director in the place of Howard Sachs, resigned.

M. L. Bettcher, former Duriron general superintendent, is now general manager, succeeding Dudley H. Miller who becomes executive vice-president. Company is also making several changes in branch office management. N. E. Philpot, who has been manager of the Chicago Office for several years, is assuming charge of the N. Y. Office, succeeding W. E. Pratt, resigned. Col. M. W. Smith, formerly manager at Buffalo, is taking over the Chicago Office. W. A. Watkins has been transferred from the general sales dept. at Dayton to Buffalo as manager.

Thomas T. Watson, who joined the metallurgical Dept. of Lukens Steel in '31, is appointed development and service metallurgist. He will be engaged principally in service and sales work in connection with Lukens Nickel-Clad steel.

Heavy Chemicals

¶*Prices Steady In New Contract Season—Emergency Schedule On Arsenates—*

November chemical volume, contrary to the usual seasonal trend, was larger when comparison is made with October; it exceeded November, '33's total by a rather fair margin. Price changes were very minor, sodium tungstate is sharply higher and a slight downward revision in sal soda is reported in the N. Y. City and Metropolitan area.

Producers and dealers are, of course, centering attention on contract renewals. Prices in nearly every case are repetitions of those now prevailing. There is a general movement toward inserting clauses in contracts calling for either a quarterly or semi-annual review. This is not a new departure. Similar clauses were inserted last year and the practice is simply being widened to include more products and sellers.

Included in the chemicals with unchanged prices for '35 are: anhydrous ammonia, ammonium carbonate, sal ammoniac, bichromates, alums, bleaching powder, soda ash, caustic and most of the acids. No announcement has been made as yet (Dec. 3) on chromic.

In the N. Y. Metropolitan area the 4 weeks of labor trouble in the Paterson dyeing and finishing district has been felt by chemical suppliers. As this is written, however, it is practically a certainty that the workers will return to their posts on Dec. 5. A fairly large backlog has been built up in the meantime.

Chemical manufacturers are interested in G. M.'s plan to stagger '35 production in order to spread employment more evenly; naturally, such action will result in a more even call for chemicals.

Opinions differ on '35 outlook for automobile production; Alexander Hamilton Institute's current bulletin questions whether recovery of automobile production will be further extended next year; Institute believes that there is little likelihood of a further increase in national income, or in the percentage of income spent on automobiles, and maintains that without the benefits of such stimulants a smaller output of cars in '35 is likely. Report is sanguine of Ford reaching the 1,000,000 announced as the '35 goal.

NRA approves declaration of emergency and a schedule of lowest reasonable costs for sale of lead arsenate and calcium arsenate in the agricultural insecticide and fungicide industry. Approval is effective for 90 days from Nov. 9. Scale of lowest reasonable costs follows, as set by the Code Authority and approved by the Board:

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
Antimony oxide	$0.09¼	$0.08½
Sodium tungstate	.90	.88

DECLINED

Sal. soda, N. Y., bags	$1.20	$1.25

INDUSTRIAL CHEMICALS

	Oct.'34	Sept.'34	Aug.'34
Exports	$1,740*	$1,782*	$1,795*
Imports	$1,171*	$1,058*	$1,193*

* 000 omitted.

DEPT. OF LABOR STATISTICS

	Oct.'34	Oct.'33	Sept.'34
Employment *a*	106.6	103.2	108.0
Payrolls *a*	92.0	85.7	92.1
Price *b*	81.1	78.6	80.3

a 1923-'25 = 100.0; *b* 1926 = 100.0.

Lead arsenate, all on delivered basis—multi-car lots, 8c per lb.; car lots, 8¼c per lb.; 10-case lots, 8¾c; less than 10-case lots, 9c.

Calcium arsenate, all on delivered basis—multi-car lots, 5c per lb.; car lots, 5¼c per lb.; 10-case lots, 5¾c; less than 10-case lots, 6c.

No member of the industry may sell the products at a delivered price less than the lowest reasonable costs set in the schedules, except under specific exemptions granted by the code. NRA Research and Planning Division is instructed to study operation of cost schedules, and to report periodically. Schedule is subject to suspension or modification by NRA.

Sales made between members of the insecticide and fungicide industry will not be subject to the code's open-price filing provisions for a 60-day period, under an order announced by NRA. Order approves Code Authority's request for a stay of the pricing provisions insofar as they relate to transactions between members and permits them to make sales to other industry members on the basis of unpublished prices when unusual conditions prevail. Industry hopes that the 60-day stay will demonstrate the necessity of a permanent stay.

Suggestions for Safe and Efficient Use of

AMMONIA

(ANHYDROUS)

Some Facts about Anhydrous Ammonia

AMMONIA is a definite chemical compound (NH_3) which exists either as a liquid or a gas, depending on its pressure and temperature. Mathieson Anhydrous Ammonia is a pure, water-free form of this material, shipped in steel cylinders under sufficient pressure to keep it a liquid. Ammonia gas is non-inflammable and not explosive, with a characteristic odor that gives warning of its presence in concentrations far below injurious ones. Liquid ammonia in contact with the skin, however, may produce serious burns.

The pressure of anhydrous ammonia in a closed container depends upon its temperature. At room temperature (70° F.), this pressure is 114 lb. per sq. in.; at the freezing point (32° F.), the pressure is 48 lb. per sq. in.; below -28° F., the pressure is zero, and no ammonia gas will flow from the container. In the presence of liquid ammonia, these pressures always remain the same (at the same temperature). The chart below shows these relations between temperature and pressure.

All pure anhydrous ammonia vaporizes at the same rate and gives the same cooling effect under the same pressure and temperature changes. The only differences that can exist between different kinds of ammonia are differences in purity.

Testing for Purity

MATHIESON ANHYDROUS AMMONIA is carefully tested at the plant by experienced chemists to assure the highest degree of purity on the market (better than U. S. Navy Specifications). These tests are much more accurate and complete than those which can be made in the refrigeration plant. However, we will be glad to supply directions for the evaporation test for purity to buyers who wish to make this test.

Detecting Ammonia Leaks

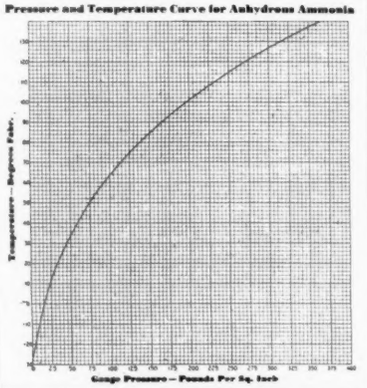
WHEN the odor of ammonia indicates a leak, it can be located with Mathieson Test Paper (phenolphthalein), which, when moistened, turns pink upon contact with ammonia fumes. Some operators prefer Mathieson Sulphur Tapers, which, when ignited, give a dense white smoke in the presence of ammonia gas.

Ammonia leaking into *sodium* chloride brine may also be detected with phenolphthalein test paper, or with Nessler's Reagent. To test *calcium* chloride brine for ammonia, first add caustic soda to a sample of the brine in a glass. Then cover with a piece of glass on the under side of which a moist piece of test paper has been affixed. On gently warming the solution, any ammonia present will vaporize and cause the phenolphthalein test paper to turn pink.

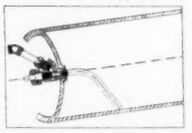
Mathieson Test Paper is available without charge to users of Mathieson Ammonia.

1. Handle cylinders carefully. Don't drop.
2. Don't store cylinders near radiators or steam pipes, or exposed to continuous dampness.
3. Keep cylinder caps and valve plugs in place when cylinders are not in use.
4. Weigh cylinder including cap before connecting, and check this weight against the gross weight shown on tag. After charging the system, weigh cylinder and cap again to make sure you have emptied contents and received full value.
5. Open valve slowly, and only with special wrench provided. (Before opening valve, read instruction tag attached.)
6. In connecting the cylinder, be sure that the valve connection is upward and that the cylinder is slightly tilted toward the valve end. Otherwise the siphon pipe will not convey all the liquid out of the container.
7. In recharging while in operation, maintain a pressure on the low side between 5 and 10 pounds. (A vacuum on the low side is unnecessary.)
8. Frosting, or sudden cooling, of the cylinder beneath the siphon pipe is an indication that the cylinder has been completely discharged. Close valve as soon as cylinder is empty. (Don't allow water or foreign matter to get into lines or cylinders.)
9. Adding ammonia cannot restore to normal operation a system containing an excess of non-condensible gas. A non-condensible gas extractor will solve this difficulty.
10. Distinguish carefully between full, partially used and empty cylinders. Return empty cylinders to the manufacturer at once.
11. Keep an ammonia gas mask available for individuals authorized to act in case of emergency. Be sure these persons are familiar with location and use of mask.

Pressure and Temperature Curve for Anhydrous Ammonia



Cross-Section of Valve and Siphon Pipe
(Connection—¾ in. std. pipe thread)



Emergency Measures

1. Only an authorized person familiar with the plant should attempt to stop a leak. If there is any question as to the seriousness of the leak, a gas mask should always be worn. All other persons should leave the affected area until the leak has been investigated.
2. If an accident releases ammonia in high concentration, remember that ammonia gas rises, and the concentration will be lowest near the floor. A wet handkerchief or cloth held over the mouth and nose provides effective temporary protection.
3. Water absorbs ammonia rapidly. If liquid ammonia has been released, flooding with a large volume of water supplied with a hose will prevent vaporization. (Do not try to neutralize liquid ammonia with acid, as the heat generated may increase the fumes.)
4. A cylinder leaking at the valve should be placed valve opening downward (siphon pipe up) so that gas instead of liquid will escape. The escaping gas will cool the cylinder and lower the rate of escape to a less dangerous point.
5. In case of fire, remove ammonia cylinders from premises if possible. If impossible, notify firemen of their location.

Treatment of Affected Persons

1. Remove affected person to open air. Call a physician immediately
   Nearest physician .....
2. If patient is unconscious, use prone pressure method of artificial respiration (same as for drowning)
3. *Nose and throat:* Rinse out thoroughly with water. Follow with diluted vinegar or boric acid solution. Urge patient to drink large amounts of water.

   Eyes: Hold open lids and pour water, then 2% boric acid solution, over eye balls. After thorough rinsing in this way, put two drops liquid petrolatum in each eye.

   Skin: Remove any ammonia soaked clothing. Rinse thoroughly with water. Then swab with a solution of picric acid or Carron Oil.

THE MATHIESON ALKALI WORKS (Inc.)

NEW YORK CHICAGO PHILADELPHIA PROVIDENCE CINCINNATI CHARLOTTE E. ST. LOUIS, ILL. WASHINGTON

AMMONIA, ANHYDROUS AND AQUA . . . CAUSTIC SODA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER
HTH AND HTH-15 . . PH-PLUS (FUSED ALKALI) . . CARBON DIOXIDE ICE . . CCB (INDUSTRIAL HYPOCHLORITE)

Printed in U. S. A.

Mathison Alkali prepares a most useful chart for anhydrous ammonia users. Copies are available.

Order of approval provides that the Code Authority must file a brief within 60 days showing the extent of inter-member transactions made during the last 5 years. Code Authority is also required to immediately notify all industry members of the stay. Members purchasing industry products will be required to comply with all code requirements as though they were handling products of their own manufacture.

Pellet Carbon Black

The panhandle district of Texas is showing great interest in the Cabot process of preparing carbon black in pellet form. Thomas D. Cabot, treasurer of the company is quoted: "The cost of preparing carbon black in small dustless spheres by our process is no greater than the cost of preparing it in the usual form."

Mathison's Opening

Mathieson's new Lake Charles plant is now expected to be in production in February. Unforeseen problems arose to prevent a December opening. A *Wall St. Journal* report states that the balance of funds needed to complete the financing of the $7,500,000 unit may be borrowed instead of an issue of stock. Report points out that Mathieson Alkali is now on a $1.50 dividend basis so that to sell common at around 30 or under would mean paying about 5% for money when the current bank rate is around 2%.

Methanol Statistics

Production statistics of crude and synthetic methanol, compiled from data received by the Bureau of the Census and the Hardwood Distillation Industry Code Authority from 36 manufacturers, are presented. Manufacturers included in Bureau's summary for December, '33, accounted for 78.9% of the crude and 100% of the synthetic.

Month 1934	Production (Gallons) Crude[1]	Synthetic
January	360,822	979,686
February	337,983	690,961
March	366,052	916,872
April	342,307	754,980
May	324,063	897,294
June	298,165	922,551
July	256,136	939,439
August	253,612	951,834
September	260,402	1,079,910
Total (9 months)	2,799,542	8,133,527

[1] The refined equivalent would be approximately 82 per cent of the crude production.

Douglas With Cyanamid

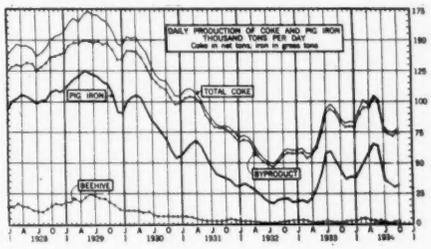
L. W. Douglas, former director of the Budget, is elected, Dec. 10, a vice-president and director of American Cyanamid Co. On Dec. 6 Arthur J. Campbell was appointed assistant general sales manager of American Cyanamid & Chemical. He continues as general manager of the Structural Gypsum Division.*

* A more detailed review of both men will appear in the January issue.

Coal Tar Chemicals

¶*Coke Production Rises—Contracts Renewed At Present Levels —Foreign Dyes—*

After 4 months of declining activity the downward trend of coke production was halted during October, daily rate of recovery of 77,548 tons per day being 3.8%


DAILY PRODUCTION OF COKE AND PIG IRON
THOUSAND TONS PER DAY
PIG IRON
TOTAL COKE
BYPRODUCT
BEEHIVE
J A O J A O J A O J A O J A O J A O J A O
1929 1930 1931 1932 1933 1934

—U. S. Bureau of the Census

higher than that of September. In spite of this gain, however, the October rate was 26.4% below the '34 peak record of May.

Output of byproduct coke for the 31 days of October amounted to 2,316,858 tons, or 74,737 tons per working day, as compared with a daily rate of 72,492 tons in September and 83,285 tons in October, '33. Expanding blast furnace operations resulted in a gain of 2.5% in the daily rate of pig iron production; responding to this activity the daily rate of coke production at furnace plants increased 2.7%, while the rate at merchant plants increased 3.7%.

Of the 91 byproduct coke plants in existence at the beginning of '34, 81 made coke during October, 63 were recovering ammonia in the form of ammonia liquor or sulfate, and 52 were making benzol or motor benzol. Beehive coke production made a further advance during the month, the daily rate of 2,811 tons showing a gain of 28.2% over that of September.

Stocks at byproduct plants continued to rise, the total on hand at the close of October amounting to 3,081,246 tons, or 8.3% in excess of September's reserves.

Manufacturers are repeating present benzol, toluol and xylol prices for the first 6 months of '35. Intermediate prices have been renewed at existing levels for the first quarter.

November business in coal tar chemicals was about equal to the volume in October. Continuance of the Paterson dyeing strike, seasonal slackening in automotive production and the approach of the end of the year (inventory season) combined to hold down purchasing largely to immediate needs. Phenol and cresylic were in specially good demand. Producers of naphthalene report that a fair-sized percentage of the '35 contracts have been signed at the figures announced last month. Generally speaking, the coal tar chemical industry

Important Price Changes

ADVANCED

Nov. 30 Oct. 31

No changes.

DECLINED

No changes.

	Oct.'34	Sept.'34	Aug.'34
Exports*	$ 904	$910	$ 868
Imports*	$1,296	$847	$1,034

* 000 omitted.

closes out the year in good shape, with stocks normal and prices steady.

October synthetic dye imports amounted to 386,708 lbs. ($607,026). This represents a gain of 104,180 lbs. and $176,597 in value over September and a 52% poundage gain and over 86% value gain over October, '33. Imports for the first 10 months are 22% lower in poundage but about 6% higher in value, when compared with corresponding '33 period.

Foreign Dye Trends

After several years of steady decline, German exports of coal tar dyes are increasing and as a consequence of increased activity in the German textile industry, domestic consumption is heavier. A report from Consul Sydney B. Redecker, Frankfort-on-Main, released by the Commerce Dept., Chemical Division, states that exports of coal tar dyes from Germany during the first 7 months of the current year totaled 18,707 metric tons, valued at 82,685,000 Rm., compared with 15,091 metric tons (74,851,000 Rm.) in the corresponding period of '33.

While domestic consumption of dyestuffs in Germany has increased considerably since the beginning of '34 it is anticipated that sales will decline during coming months as imported raw materials such as cotton and wool are becoming scarce owing to the insufficiency of foreign exchange required for their importation. This shortage of textile materials has already resulted in curtailed operations and reduced output, the report states. German coal tar dyes are exported to all textile producing countries. Statistics show that of the $4,158,100 worth of coal tar dyes imported into the U. S. during the first 10 months of '34, approximately half were shipped from Germany.

Japan Makes Rapid Strides

Supported by a large and expanding domestic textile industry, Japan's coal tar dye producers have made rapid strides during recent years. At the end of '32 a total of 16 dyestuffs companies had a paid-up capital of 9,055,000 yen. As 189,870,000 yen of new capital was invested in the entire Japanese chemical

industry in '33, it is safe to assume that a substantial portion of this amount was used for establishing coal-tar dye plants.

A report just issued by the Japanese Coal Tar Manufacturers' Association covering '32 credited Japan with having 58 factories at the end of that year. A total of 440 different products, valued at 30,613,000 yen, were being produced in these plants giving employment to 4,010 persons.

No details are available concerning all the items produced but the report mentions that 232 coal-tar dyes, 118 coal-tar intermediates, 55 synthetic medicinals, 16 perfume materials, and 19 "other" products were being manufactured at the end of 1932. A total of 42 plants were engaged in the manufacture of dyestuffs and intermediates, 13 were producing medicinal chemicals, 3 perfumes and 3 "other," according to the report.

Statistics show that Japanese producers of coal-tar dyes are now supplying the bulk of the domestic demand and in addition are developing an export trade in these products. Production in '33 totaled 19,804 metric tons compared with 9,659 tons in '31; imports declined from 1,998 to 972 metric tons. Exports during these periods increased from 2,011 to 6,083 metric tons.

Construction

Perth Amboy's new sewage disposal plant is rapidly nearing completion. Consulting engineer is Louis P. Booz, Perth Amboy, and Filtration Equipment (a Cyanamid subsidiary) is in charge of the construction.

Pittsburgh Plate Glass is planning a $40,000 addition to the Barberton, Ohio, plant.

Acheson Graphite awards contracts for erection of a Niagara Falls unit to cost $100,000.

Cincinnati Chemical awards contract for a $50,000 addition to its Bernard, Ohio, plant.

FERA is said to be producing sweetpotato starch at a factory at Laurel, Miss.

New plant of Brunner, Mond Canada, Ltd., under construction at Amherstburg, Ont., will cost over $500,000. It is designed to supply the total Canadian market for calcium chloride.

Electroplating

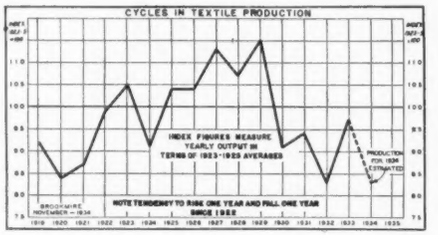
G. Byron Hogaboom, Jr., establishes a commercial laboratory at 352 Mulberry st., Newark, N. J., specializing on electroplating problems.

L. O. Edelman now represents Frederick Gumm Chemical, Union City, N. J., in New Jersey and Pennsylvania.

Textile and Tanning Chemicals

¶Textile Outlook Promising — Paterson Strike Ends—Quebracho Pool Functioning—

Chemical companies supplying textile chemicals can look optimistically to '35, if Brookmire prognostications, contained in a special study of the textile field, are


CYCLES IN TEXTILE PRODUCTION
INDEX FIGURES MEASURE YEARLY OUTPUT IN TERMS OF 1923-1925 AVERAGES
NOTE TENDENCY TO RISE ONE YEAR AND FALL ONE YEAR SINCE 1932
BROOKMIRE NOVEMBER — 1934
PRODUCTION FOR 1934 ESTIMATED

Will '35 be a good textile year?

correct. Says the report: "The textile industry can look forward to increased business in '35 on the basis of its normal cyclical movement. While few things in the economic picture move with clock-like uniformity, the tendency for textile activity to alternate in one year of rise and one year of decline is well defined—like the ebb and flow of the tides." As '34 saw a decline, the natural assumption is that '35 will see a decided upturn.

Flags Fly In Paterson

With bands playing and flags flying some 7,000 of the 25,000 striking Paterson dyers and finishers celebrated on Dec. 3 with an impromptu parade the signing of the peace pact which brought to an end the 4 weeks of labor strife. Contract runs to Aug. 31, '36. Agreement calls for a 36-hour week, 66c an hour for men, 48c for women, union recognition and the provision that jobs vacated by union men will be filled with union men. This last is a compromise on the demand for a closed shop. A busy month or 2 is in store for the dye houses.

A Drive For Leather

A drive to promote leather and recover markets lost to substitutes will be started by the leather and allied industries, L. J. Robertson, chairman of the industry's committee on substitutes and replacements, reports. Program embraces 4 points, hygienic, economic, legislative and publicity. Health angle of leather will be stressed to stores and shoe repair men, more rigid standards for shoes will be sought in order to promote wider use of leather, while the trade survey bureau of the Tanners Council will send out bulletins citing loss of markets to substitutes.

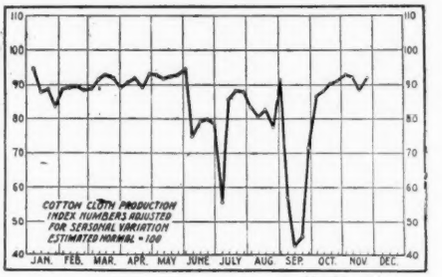
Better Chemical Demand

Demand from the textile centers last month presented a very mixed picture. In most of the cotton production sections

Important Price Changes

	Nov. 30	Oct. 31
ADVANCED		
Aluminum Chloride, anhyd	$0.05	$0.04
Annatto, seed	.07	.06½
Dextrin, British Gum	4.30	4.20
Corn Canary	4.05	3.95
White	4.00	3.90
Quebracho, solid	.03⅝	.02⅞
Clarified	.03⅞	.03
Starch corn	3.46	3.36
Powdered	3.56	3.46
Wattle bark	31.50	30.50
DECLINED		
Cochineal, gray	$0.34	$0.33
Silver	.35	.34
Egg yolk, imp.	.44	.45
Myrobalans J1	24.50	25.00
J2	15.75	16.25
Sumac, Italian	59.00	62.00
Zinc dust	.057	.0582½

activity spurted ahead despite the fact that the usual seasonal trend is down. This is directly attributed, of course, to the backlog created by the recent textile strike. On the other hand, the Paterson-Passaic dyeing and processing area was


COTTON CLOTH PRODUCTION
INDEX NUMBERS ADJUSTED FOR SEASONAL VARIATION
ESTIMATED NORMAL = 100
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEP. OCT. NOV DEC.

—N. Y. Times.

practically idle for 4 weeks with 25,000 workers reported out on strike.

Interest centered on the quebracho market. First result of the formation of the Argentine Producers' pool was higher prices. New quotations are firm for 6 months. Further stability is expected here, the result of the appointment of only 2 representatives of the pool. Bichromate contracts are being solicited on the basis of this year's contract figures, but anhydrous aluminum chloride is up 1c. Rise in starch and dextrin simply reflects the recent strength in the corn market.

Market for tanning oils remains firm. Cod is quoted at 35 to 36c in tanks and 40c in drums. Light pressed menhadan fish oil is reported at 32c in tanks and 39c in drums. Neat'sfoot, 20 degree, cold test, is very firm at 15½c per lb.

'35 Colors

The 1935 Spring Woolen Card, portraying 48 shades, is issued in a new and enlarged form to members of the Textile Color Card Association.

Unusual new tints, featured as "The Regency Pastels," provide a highly important color influence in the collection of '35 Spring silk shades which the Association has just issued.

Personal Notes

Philip H. Stott of the technical laboratory of the du Pont dyestuffs division, and Morris Blackman, assistant superintendent of the printing and coloring division, Textile Dyeing Corp., were the principal speakers at the November meeting of the N. Y. section of the A. A. T. C. & C.

Max Cramer, former Lyons Piece Dye manager, is now manager at the Long Island City, N. Y. plant of United Textile Print Wks.

Alexander Dies Nov. 2

William L. Alexander, senior vice-president of Sterling Oil of Emlenton, Pa., well-known in tanning circles, on Nov. 2, of a cerebral hemorrhage.

Rubber

Akron Rubber group of the A.C.S. listens Dec. 7 to Binney & Smith's director of research, W. B. Wiegand, relate about his recent Far East trip. R. O. Bishop of the Rubber Research Institute of Malaya tells the intimate story of "Recent Developments on Latex Production." Los Angeles Rubber group will elect officers on Dec. 12 and then listen to a paper on "Reclaims" by G. W. Miller of the Xylos Rubber staff. N. Y. group's Christmas party is scheduled for Dec. 14 at the Building Trade Employers' Association, 2 Park ave. Prof. E. A. Hauser will lecture on latex. He is also scheduled to appear before the Boston group on Jan. 7. The Christmas party of the Chicago group is scheduled for the same date. W. B. Wiegand will speak at this meeting too. Reservations may be made by contacting B. W. Lewis of Wishnick-Tumpeer's Chicago office.

Revertex Corp. of America adds Dr. K. H. Quasebarth to the staff as technical advisor. He is just back from a European trip devoted to a detailed investigation of the latest developments in latex technology.

Valuable Literature

Rubber chemists will welcome "Rubber: Its Anti-oxidants and Preservatives"—bibliography compiled by the Science Library and Research Association of British Rubber Manufacturers. Price is 5s. 7d., and office of the Association is in London.

Chemically Treated Silk

"Stedtex" is a chemically-treated silk made by Stedfast Rubber, Boston. It is waterproof, sunproof, crackproof, oilproof and resists fire. Fabric may be used for shower curtains, baby accessories, raincoats, aprons, etc.

Merchants' Chicago Office

Merchants Chemical's Chicago office is now located at 2001 W. Pershing Road.

Paints, Lacquers and Varnish

¶Pigment Contract Prices Announced—FHA's Gains—Holton Dies—Exports Improve—

An advance of 1c has been made in iron blues, the contract quotation being 36½c and the spot price 38c. Contracts have been offered for the entire year with provision made for quarterly adjustments, if necessary. Similar clauses are being inserted in contracts for chrome yellow, chrome green, toner reds, zinc yellow, red lakes and other chemical colors. Carbon black producers, on the other hand, are offering to renew existing contracts for a 6 months period, with a possible revision or adjustment in July. White lead, lithopone, titanium pigments and zinc oxide manufacturers have adopted a similar procedure. Nitrocellulose has been offered at unchanged levels, firm for the first 6 months and with quarterly adjustments in the last 2 quarters.

November purchasing of raw paint materials was in specially good volume, the total for the month exceeding any of the past few months and equal to the spurt made in the very early Spring. Demand for paints has been stimulated by the HOLC and favorable paint weather, better purchasing power of the farmer and improvement in building activity. Lacquer sales are down somewhat as November automotive production reached only 70,000 units, but this is purely seasonal and a decidedly better tone is already noted in the first week in December.

If tentative schedules planned by motor-car manufacturers for December are fulfilled, month's output will nearly double that of November and will exceed by 78% the December production of '33. Plans call for production of approximately 150,000 cars and trucks in December. There were 83,827 units in December last year. Indications are that output in November this year was somewhere in the neighborhood of 75,000 units. Manufacturers admit that their December schedules represent only marks at which they aim.

October contracts for residential building in 37 Eastern states were $26,299,800, an increase of nearly 50% over September and more than 20% above the corresponding month last year, according to F. W. Dodge Corp.

Gains in residential building over September were reported in all districts except New England, Chicago and southern Michigan and gains over a year ago were recorded in all except New England, upstate New York and Texas.

For the first 10 months total of residential building was $12,000,000 above the like period last year. These gains in residential construction were a major factor in increased totals for all classes in October and the 10 months.

October contract total of $135,524,800 for all classes of construction was larger than for any month since March. This compares with $110,151,200 for September and $145,367,200 for October, '33.

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
Iron blues	$0.36½	$0.35½

DECLINED

Casein, dom. 20-30	$0.09¼	$0.09½
80-100	.10	.10½

EXPORTS

	Oct.'34	Sept.'34
Pigments, paints, varnishes	$1,025*	$1,182*

* 000 omitted.

DEPT. OF LABOR STATISTICS

	Oct.'34	Oct.'33	Sept.'34
Employment *a*	99.4	94.0	98.8
Payroll *a*	78.0	70.7	75.8
Prices *b*	79.4	76.1	79.5

a 1923-'25 = 100.0; *b* 1926 = 100.0.

FHA Loans Help

Officials of the FHA, after a tour of the country, indicate that with the estimated $5,000,000 a day in loans and cash accumulations going into modernization the goal of $1,500,000,000 business by the end of '35 is by no means unattainable. An estimated $1,000,000 a day is being loaned in modernization credit loans. The volume of business so far developed has materialized before many of the nearly 4,000 local campaigns have gained full stride.

N. Y. leads all other states both in number of loans insured and the volume of funds spent on home renovation, the Federal Housing Administration reports.

Through Nov. 21, loans to residents of N. Y. insured by the organization numbered 6,201 for an aggregate of $5,207,453. California came 2nd, with 6,201 loans for $2,413,362, and New Jersey third with $2,423 loans for a total of $1,140,279. Pennsylvania with 2,391 loans for $969,250; Massachusetts, with 2,033 for $827,515, and Illinois, 1,922 for $762,857, trailed in the order named. Loans to residents in these 6 states aggregated more than 50% of the total business done by the FHA in insuring loans through Nov. 21.

We Gain In World Markets

U. S. exports of paints and paint products (not including naval stores) increased 30% in value to $10,249,000 during the first 9 months of '34 compared with corresponding period last year. Ready-mixed paints, stains, and enamels increased 62% in quantity to 1,395,000 gal.

and 63% in value to $2,488,800. Foreign nitrocellulose lacquer shipments made an impressive showing—an increase of 53% in quantity to 739,000 gal. and 43% in value to $1,195,000. Varnishes and mineral earth pigments increased both in quantity and value but chemical pigments exports decreased 7% in quantity while value increased 18% to $5,324,700.

For Charity

A group of representative members of the paints, oils, varnishes, and related trades, under the leadership of M. J. Merkin, M. J. Merkin Paint Co., are in the midst of an ambitious campaign to aid the $2,071,000 Emergency Appeal of Federation for the Support of Jewish Philanthropic Societies of N. Y. City, following a dinner meeting in the Metropolis Club on Nov. 27. A. C. Horn, of the A. C. Horn Paint Co., jointly with Mr. Merkin, acted as host to the gathering, which constituted itself the 1934 Paints and Chemicals Division of the Federation, with Mr. Merkin as chairman. A quota of $25,000 has been adopted as the goal which the division is to reach by or before the end of the campaign, on Dec. 31.

Paint Companies

Detroit Graphite creates a technical service with W. J. Boston, vice-president and for 30 years general superintendent of factories, in charge.

A. C. Horn Co. appoints Phillips, Lennon & Co., advertising counselors.

Du Pont will employ 300 in Toledo when remodeling of former Mountain Varnish plant is completed. Dulux, and a full line of paints, varnishes and lacquers will be made.

Acme White Lead & Color is forming Jackson Paint & Varnish as a subsidiary.

Varcum Chemical, Niagara Falls synthetic resin manufacturer, appoints Harry Haze, Inc., Chicago, mid-west representative, and E. S. Kaiser, Louisville, in adjacent territory.

Valspar Corp.'s assets are offered at auction. This is said to be the first step in reorganization plans.

Glidden's October sales are said to have been the best in any October in the last 5 years.

National Lead opens a Sacramento office.

Paint Personnel

E. D. Griffin, with Pittsburgh Plate Glass for a number of years, is now manager of the paint and varnish division with headquarters at Milwaukee.

R. E. Donnoly is sales manager for F. O. Pierce Co., Brooklyn paint manufacturer; E. J. Lyons, former sales manager, is now vice-president.

Standard Varnish engages 8 men formerly with Mountain Varnish. They will hold positions as follows: L. Martin Courtney, general sales manager; Ralph W. Darner, manager of laboratories and factory; Paul Evans, chief chemist; Omar McDaniels, head of varnish experimental dept.; James Mann, purchasing agent; Gordon Lennox, sales engineer; B. C. Macdonald, sales representative; Willard Boshart, sales assistant. Standard Varnish has opened Toledo sales office and warehouse.

Sam Moore has returned to the Arco Co., Cleveland, as vice-president and assistant to the president.

Associations

Baltimore Paint, Varnish and Lacquer Association's Christmas party is scheduled for Dec. 21 at the Southern Hotel. St. Louis Production Club's party will be held Dec. 11.

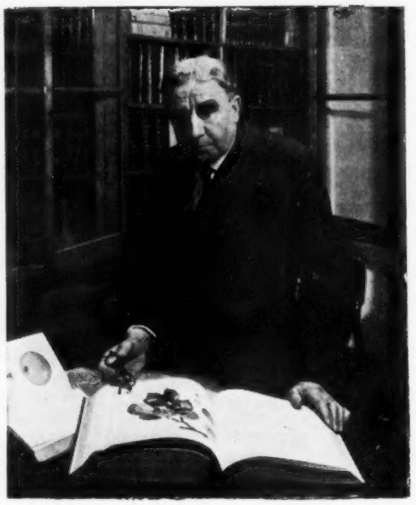
George A. Goodel, Kentucky Color & Chemical's vice-president and chief research chemist, takes "Thirty Years of Progress in the Dry Color Industry" as his text in his recent address before the Louisville Production Club.

Baltimore P. & V. P. Club listens to R. T. Vanderbilt's James Heckel speak on "Surfex," a special calcium carbonate.

Cleveland P. V. & L. Association and 3 other paint associations in Cleveland hear Dr. F. L. Browne, Forest Products Laboratory's senior chemist, lecture on "Painting Characteristics of Hardwoods and Softwoods." Nearly 200 attend.

Deaths

E. C. Holton, 69, world famous paint chemist and chief chemist of Sherwin-Williams, on Nov. 30 after a brief illness. President Martin of S.-W., on being informed of Mr. Holton's death, said, "In my opinion nobody has contributed as much to the science of paint making and the industry suffers a great loss in the passing of this noble character."



E. C. HOLTON

Robert T. Neilson, 72, National Lead's Chicago office, on Nov. 22 after a 2-day illness.

Paint Personals

Frank C. Smith, sales manager of National Lead's Chicago white lead dept., retires after 37 years' service with the Carter and National Lead Companies.

Rudolf Neuburger, Zapon, is guest speaker, Nov. 10, of the Advertising Club of Newark. Zapon is an Atlas Powder subsidiary.

Andrew L. Somers, president, Fred L. Lavanburg Co., is recuperating from a recent operation.

Detroit production group's latest meeting brought P. E. Marling of the Thomas & Hochwalt Laboratories, Dayton, to talk on "Processing of Non-Shining Lacquers."

Linseed Oil

Favorable prospects for the Argentine flaxseed crop indicate that the world flaxseed supply (excluding Russia) is likely to be somewhat larger than last year, according to the Bureau of Agricultural Economics, in its current report on world flaxseed prospects. But world demand for flaxseed, as measured by building activity in various countries, is reported to average much above the depression low. Recent price trend of flaxseed has been downward in important markets, reflecting prospects for a somewhat larger crop in Argentina, it is stated. Prices in the U. S. and Canada are above prices in November a year ago, but in Argentina prices are below last year's.

Production in the U. S. is estimated at 5,198,000 bu., which is the smallest crop on record, and approximately 25% less than last year's output. Reduced acreage is in part responsible for the decrease, but drought and extreme heat in a large part of the important flaxseed producing belt, coupled with late August frosts, have been large contributing factors.

Crop in Canada is estimated at 955,000 bu., compared with 632,000 last year. Production in European countries also is larger this year, except in Russia which has not entered importantly into international trade this season.

Flaxseed Institute of the U. S. reports 3rd quarter linseed data as follows:

	Gallons
Stocks, June 30	17,121,792
Production, July, Aug., Sept.	11,338,357
Imports, July, Aug., Sept.	99,522
Total	28,559,671
Less stocks, Sept. 30	14,582,320
Consumption, July, Aug., Sept.	13,977,351
Decrease, 1.899% under 1933.	
Exports	28,284

Dept. of Agriculture's estimate of Nov. 1 of the '34 flaxseed yield is only 5,198,000

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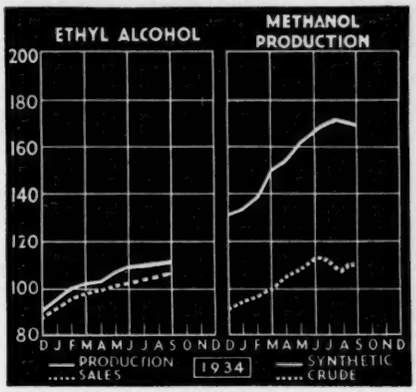
SOLVENT NEWS

Reg. U. S. Pat. Off.

DECEMBER ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1934



(moving twelve-month averages, 1931 = 100)

CURRENT PRODUCTION

		1934	1933
ETHYL ALCOHOL			
1000 proof gals.	Jan.-Sept.	122,247	100,309
	September	15,636	13,968
	August	13,823	12,482
Sales			
1000 proof gals.	Jan.-Sept.	109,947	80,454
	September	17,821	13,268
	August	13,156	10,232
METHANOL			
Crude 1000 gals.	Jan.-Sept.	2,799	2,092
	September	260	243
	August	254	262
Synthetic 1000 gals.	Jan.-Sept.	8,133	5,089
	September	1,080	1,461
	August	952	860

MAJOR CONSUMERS OF SOLVENTS MORE ACTIVE: MARKET QUIET

While the activities of the Federal Housing Administration have served to stimulate the paint, varnish and lacquer industry, and preparations for the introduction of new models have increased the activity of the automotive manufacturers, the demand for solvents and diluents in these quarters remained relatively quiet during the past month. Withdrawals continued light, with purchasers ordering for year end requirements.

Figures on the production of industrial ethyl alcohol show a marked gain for September with a total output during that month of 15,635,966 proof gallons.

DOMESTIC AND FOREIGN PAINT SALES SCORE MARKED GAINS

Increased sales of paint products in the United States since the first of the year have closely paralleled the advance in exports of these commodities according to a report from the U. S. Commerce Department's Chemical Division.

Domestic sales of paint, varnish, and lacquer products, reported by 586 establishments, were valued at $199,630,000 during the first eight months of the year, an increase of 31% over the corresponding period of 1933, and exports of paint products, including pigments, increased 31.5% to a value of $9,167,700.

Paints, stains and enamels exported increased 65% to a total value of $2,201,400, and lacquers shared in the advance, increasing 42% in value to $1,044,650. Exports of carbon black declined somewhat in quantity but increased 10% in value to $3,423,760.

INDUSTRIAL ALCOHOL INDUSTRY CODE OF FAIR COMPETITION APPROVED AND NOW EFFECTIVE

Price Lists and Revisions Open to Inspection

The open price provisions of the Industrial Alcohol Industry Code, supplementary to the Chemical Manufacturing Industry Code, have been approved and became effective November 8th, 1934; other provisions of the Code having been in operation since their approval on August 21st, 1934.

The Code covers the sale of alcohol for both industrial and anti-freeze purposes. The "products of industry" as defined by the Code are: "Ethyl alcohol, denatured alcohol (including the product known as 'proprietary solvent') *sold for industrial purposes*, and ethyl alcohol, denatured alcohol, isopropyl alcohol and methyl alcohol (other than that produced by the destructive distillation of wood), or any product containing 70% or more of any of these materials, or any product containing a combination of 70% or more of any of these materials, *sold for anti-freeze purposes* by any member of the Industry."

Open Price Provisions

Under the Code, each member of the industry is required to file lists of all prices, discounts, rebates, allowances, whether guaranteed against decline and/or other terms of sale. A similar provision has been embodied in the Code of the Hardwood Distillation Industry covering sales by members of that industry of methyl alcohol for anti-freeze.

All lists or revisions of price terms of members of the Industry are available to all users of the material who apply therefore and have offered to defray expenses of the Code Authority for their preparation and distribution. All lists are open for inspection by any customer at the office of the Code Authority, 420 Lexington Avenue, New York City.

The Code Authority consists of the following members: Chairman, Glenn Haskell, U. S. Industrial Alcohol Co.; Vice Chairman, A. K. Hamilton, Pennsylvania Alcohol Corp.; Lester S. Bacharach, Empire Distilling Corp.; M. F. Chase, Commercial Solvents Corp.; Harry E. Dunning, American Commercial Alcohol Corp.; C. Esteva, Puerto Rico Distilling Co.; J. W. McLaughlin, Carbide & Carbon Chemicals Corp.; J. G. Park, Standard Alcohol Corp. and J. J. Smith, Publicker Commercial Al-

(Continued on next page)

DR. F. J. METZGER AWARDED 1934 CHEMICAL INDUSTRY MEDAL

The Chemical Industry Medal for 1934 was awarded to Dr. F. J. Metzger of New York, for his numerous contributions to the research and application of the gases in the atmosphere. The presentation was made at a meeting of the Society of Chemical Industry held on November 9th.

Dr. Metzger is director of research of the U. S. Industrial Alcohol Co., and the U. S. Industrial Chemical Co., Inc., and is vice-president in charge of research of the Air Reduction Company.

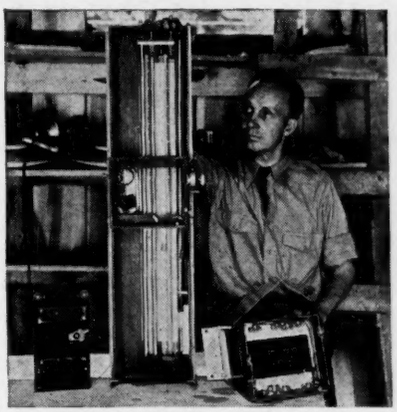
In his acceptance speech, Dr. Metzger spoke of the gases in the atmosphere and predicted the substitution of krypton and xenon, the two rarest gases, for argon in electric light bulbs.

The Chemical Industry Medal is presented annually by the Society for the successful application of chemical research to industry.

BAROMETERS FOR STRATOSPHERE FILLED WITH BUTYL PHTHALATE

Man's exploration of the stratosphere has created a new and unusual use for butyl phthalate where this chemical is employed in barometers which are used at high altitudes.

The photograph below shows the official barometers used by the U. S. Army



© *Photo, reprinted courtesy National Geographic Magazine*

Air Corps in their flight into the stratosphere last July. Because it was planned to rise through relatively dense lower atmosphere and to enter into very thin air, two barometers were provided. They are housed in the vertical box shown in the center and consist of two U-shaped glass columns, one filled with mercury and the other filled with normal butyl phthalate, with a millimeter scale between them.

The butyl phthalate barometer was necessary because in thin air the mercury-column falls very little, even with a considerable increase in altitude. In such regions, the butyl phthalate column takes up the task and registers more sensitively.

At the right of the barometers is the camera box for automatically recording the barometer readings.

Prepared Monthly by the U. S. Industrial Chemical Co., Inc.

ADVERTISEMENT—*This entire page is a paid advertisement.*

DECEMBER ★ **SOLVENT NEWS** ★ 1934

NEW LAUNDRY COMPOUND FOR REMOVING NAIL POLISH STAINS

Gives 100% Clean Linen

A new compound, of special interest to the larger linen supply houses operating power laundries, has been developed for removing nail polish stains from linen hand towels and is now manufactured by the U. S. Industrial Chemical Co., Inc.

The problem of removing nail polish stains is one of long standing. The usual nail polish contains nitrocellulose, which is very durable and substantially unaffected by ordinary detergents and washing operations. Therefore, a suitable solvent must have the property of loosening and removing the polish but must not damage the fabric.

U.S.I. Washing Compound, the trade name of this new solvent, will not damage cotton or woolen fabrics. It does not dissolve the nail polish but softens it sufficiently so that the mechanical action of the washing machine removes it in the same way as ordinary soil. The compound is a colorless, non-inflammable liquid. It has no effect on metal, wood, cotton or wool, but decomposes rubber in any form and will dissolve artificial silk and rayon.

The economy and effectiveness of U.S.I. Washing Compound have been demonstrated by a two-year experimental test period under actual operating conditions. By its use it is now possible to eliminate virtually all "discards" formerly caused by nail polish stains and in this way considerable economy has been effected in replacement costs.

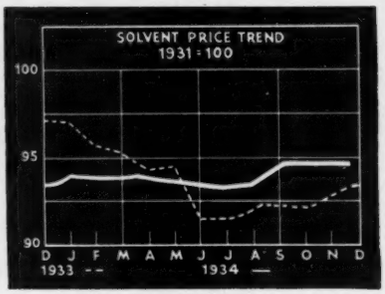
INDUSTRIAL ALCOHOL CODE

(Continued from preceding page)

cohol Co. Robert T. Baldwin, Secretary of the Solvents Institute, is Director and Treasurer.

The Industrial Alcohol Code is devoted solely to the trade practices and administrative functions of the Industry. Labor provisions continue to be governed by the Code of the Chemical Manufacturing Industry.

A new coating material described as "porcelain-like" has been developed for lining processing machines requiring non-absorptive, non-contaminating interiors. It is described as stainless, acid-resistant, and shock-proof.



SOLVENT PRICE TREND

While the index number registered a fractional gain in the average price level for solvents and diluents during the past month, the market was characterized by extreme steadiness; changes in quotations were few.

The steady undertone has been apparent not only for spot prices but likewise on contract commitments for forward delivery.

The index number for November 15th was 94.97 compared with 94.95 for the preceding month.

U. S. PAINT SALES POTENTIAL

An interesting survey of the sales potential for ready mixed paints in the United States has recently been prepared, which calculates, among other things, a total domestic sales potential for the year 1934 of 80,054,127 gallons.

This figure, arrived at by a system of multiple correlation, is broken down for the 102 major city markets in the United States showing the percentage of the total potential market that each city market represents. For example, the territory in and around Cleveland, Ohio, is estimated to represent a market of 2,367,762 gallons, or 2.96% of the total market in the United States.

The survey, prepared by Major Market Newspapers, Inc., with offices in New York and Chicago, is copyrighted, but the information will be loaned to interested manufacturers in the trade.

TECHNICAL DEVELOPMENTS

A "rubber putty"—combining putty and rubber—is now available which is claimed to resist effectively the action of corrosive chemicals and fumes, and because of its rubber content offers a high resistance to moisture. It is also reported to show a high degree of adherence to steel surfaces.

U S I

A new type color analyzer for measuring color in terms of (1) hue, (2) saturation and (3) brilliance, provides a method for intergrating colors by a numerical system. Paper, paint, powders, liquids, creams and emulsions are among the materials which may be "analyzed."

U S I

Rubber cement, sprayed on the mould surfaces, is used in the making of fine bronze castings. The method has been found to give firm adhesion of fine surface particles and assures accurate reproduction of the details of the casting. Economy in handling of moulds, as well as excellent quality castings, are reported. This method also permits casting of bronze in greens and moulds.

U S I

A new type paint with a rubber base has been developed for cement floors, especially cellars where dampness ordinarily makes painting impractical. It is applied with a brush and is reported to form a hard glossy film, unaffected by water or alkali in the cement.

U S I

Cellulosic materials and fabrics may be preserved and rendered fireproof by a series of chemical treatments followed by impregnation with chlorinated rubber, according to a patent assigned to the people of the United States.

U S I

A new, continuous dispersing machine, now available, is said to incorporate several improvements over the old type. Operating on new mechanical principles, it insures absence of air infiltration, and gives extremely fine dispersion in the liquid phase and of solids in liquids. It is also said to permit increased concentration of solids.

U S I

The baking of paint on iron by induction heating is the principle on which a new baking and drying oven operates. The iron parts, after they have been coated, are passed through an alternating current magnetic field in a manner to generate heat current directly in the parts. Heated from the inside out, firm coatings of exceptional quality are said to result. Drying time is short as the correct temperature is reached rapidly.

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Completely Denatured—All Formulas
Anhydrous—Denatured
Absolute—Pure
C.P. 96%—Pure and Denatured
Solox—The General Solvent
Super Pyro—The Rustproof Anti-freeze
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Normal and Secondary
Methyl Alcohol

ANSOLS
Ansol M
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ETHERS
Ethyl Ether
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NITROCELLULOSE SOLUTIONS
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Cotton Solutions

ESTER SOLVENTS
Acetic Ether
Amyl Acetates
High Test
Commercial
Technical
Secondary
Butyl Acetates
Normal
Secondary
Diatol
Diethyl Carbonate
Estersols
Ethyl Acetates
85-88%, 99%, and U.S.P.
Ethyl Lactate

PLASTICIZERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate

OTHER PRODUCTS
Ethyl Acetoacetate
Ethyl Chlorcarbonate
Ethyl Oxalate
Ethylene
Sodium Oxalacetate
Acetone
Methyl Acetone
Curbay Binder
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bu. This is the lowest on record and compares with a production last season of 6,806,000 and an average for the 5-year period from '27 to '31 of 18,664,000.

Compared with the close on Oct. 31, flaxseed prices on Nov. 30 are up approximately 5c. As a result, linseed is higher. Demand improved somewhat in the last month. Linseed oil prices are now closer than have been for a long time to the quotations for other vegetable drying oils. Comparison of prices on flaxseed and linseed follows:

Linseed Prices

	Oct. 31	*Nov. 30*
Boiled, tks	$0.085	$0.087
c-l, bbls	.091	.093
Raw, tks	.081	.083
c-l, bbls	.087	.089

Flaxseed Prices

	Oct. 31		*Nov. 30*	
	Dec.	*May*	*Dec.*	*May*
Minneapolis	$1.80½	....	$1.82	$1.86
Duluth	1.78*	$1.80	1.84	1.86½
Winnipeg	1.30⅛	1.35*	1.35¼	1.42⅛
Buenos Aires	.97½		1.02½	

* Bid.

Argentine Government announces (Nov. 29) that the minimum guaranteed prices on the new flax crop would be the same as the minimum guarantee for last year. This minimum price is 11.50 pesos per 100 kilos at Buenos Aires, which is 3 or 4c per bushel under the present price for new crop flaxseed.

Flax Grading

Dr. H. L. Walster, president of the Flax Institute and Dean of Agriculture, Fargo, N. Dak., is named head of a committee of experts to study marketing flaxseed with reference to oil contents.

Dr. A. Swarcman, research department chief of Spencer Kellogg; S. O. Sorenson, Archer-Daniels-Midland; Dr. Clyde McKee, Montana State College; R. B. Cornell, chief of laboratory, Pittsburgh Plate Glass, Red Wing plant; M. W. Thatcher, Farmers' Union and Farmers' National Grain Marketing Corp.; Prof. T. H. Hopper, North Dakota University, also are committee members. Others will be added at the discretion of the chairman.

Consensus of opinion following the A.A.A. marketing conference on flaxseed held in Chicago Nov. 23 was that Federal grading of flaxseed on the basis of oil content and quality seems more than likely in the near future.

Chemical Employment

Chemical and related products made a 0.6% factory employment gain between Sept. 15 and Oct. 15. At the end of the period employment stood 0.1% above the corresponding level of '33. Payroll totals increased 1.4% and stood 6.7% above the corresponding. level last year. Detailed statistics are given in the various news sections.

Oils and Fats

¶*Cottonseed Oil Goes Still Higher—Cotton's Strong Statistical Position—Other Oils Bullish—*

Cottonseed oil trading continues to be spectacular and new highs have again been made in the past month. While undoubtedly a stronger bearish element is growing, it has not been strong enough to offset any tendencies towards natural reactions. The statistical picture still remains good, but it is impossible not to appreciate that actual consumers are looking upon present prices with little enthusiasm. A comparison of end-of-the-month quotations shows the status of the market quite noticeably.

	Close Oct. 31	Close Nov. 30	Last year
Dec.	8.58-8.62	9.75	4.26-4.40
Jan.	8.58-8.62	9.80-9.85	4.36-4.44
Feb.	8.60-8.70	9.85-9.94	4.40-4.60
March	8.74	9.87-9.90	4.64

* Bid; † sales.

Quotations on the more forward months are even higher, June, for example, closing Nov. 30 at 10.10-10.15. Crude markets continue firm and sales on Nov. 30 were put through at 8¾c. Lard holds at high levels, in fact, a new season high was made as the month closed.

Trade authorities characterized the Census Bureau's monthly cottonseed oil report as decidedly bullish. October consumption (360,024 bbls.), while less than the record of 435,455 bbls. in September, topped October, '33 by 40%. Consumption for the first 3 months of the new crop year is 64% ahead of the same period a year ago. Larger users of cottonseed oil are said to be of the opinion that the price is too high and are casting about for substitutes, one of which is peanut oil. Predictions that imports of that commodity will increase, are heard, and in that connection, a decline in consumption of cottonseed in the coming months, is forecast in some quarters.

Nov. 1 Cotton Estimate

Cotton's bullish statistical position continues to add strength to cottonseed oil markets. Dept. of Agriculture's Nov. 1 estimate of 9,634,000 bales compares with a crop of 13,047,000 bales in '33; crop of 13,001,000 bales in '32; and is 5,032,000 bales less than the average crop during the 5-year period, '28-'32.

Cotton ginned to date (Nov. 1 figures) is the smallest volume (7,920,231 bales) of any season since '23. This compares with 10,355,031 in '33; 9,247,045 in '32; and 12,124,295 in '31.

A cotton control program limiting '35 plantings to 75% of the average for 1928-32, or about 32,000,000 acres, in return for rental and benefit payments of about $95,000,000 to landlords and tenants is the latest A.A.A. plan.

On the basis of a probable yield of about 180 lbs. of lint cotton per acre on the reduced area to be planted and about the same number of cooperating producers as complied with this year's program, the A.A.A. expects its '35 plan to result in a crop of about 12,000,000 bales.

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
Chinawood, c-l, drs	$0.09	$0.08¾
tks, spot	.084	.082
tks, coast	.084	.08
Copra	.0165	.0155
Corn, crude, tks	.09	.07⅞
ref'd, bbls	.11	.10
Degras, dom	.04¼	.03¾
Palm Kernel, ship	.0295	.0285
Peanut, crude, tks	.08¾	.07¾
Perilla, coast, tks	.07⅞	.07⅝
New crop, ship	.066	.063
Sesame, white	.12¼	.11½
Yellow	.12¼	.11½
Soybean, crude dom, tks	.07½	.06½
ref'd, tks	.08	.07

DECLINED

Menhaden, ref, tks	$0.046	$0.056
Oleo, No. 1	.11⅛	.11½
No. 2	.10⅞	.11¼
Sardine, ref, tks	.046	.056

Little Forward Buying

Oil markets were somewhat more active in November than for some months past, but buying is still of a conservative character and usually for replacement of existing stocks. There is a minimum of forward buying despite the fact that the general price level continues to rise and with more than an even chance that this movement will go further in the coming year. Quite naturally there is some hesitancy and less reason for accumulating oil stocks at this time such as existed at the close of last year when inflationary talk was much more prevalent than it is now. It is impossible to determine with any degree of certainty what the feeling in Congressional circles will be toward a change in the coconut oil situation.

Oil "Jottings"

C. C. Concannon, chief of the chemical division, Bureau of Foreign and Domestic Commerce, reports after a trip through the South that tung tree plantations will produce a crop sufficient to market 500,000 lbs. of tung oil, about one-half of 1% of domestic consumption.

Larrowe Milling, Rossford, Ohio, is a new soy bean oil producer. A. A. Bame, former Hershey Corp. engineer, is in charge. Another newcomer in the field is Central Soyan Co., Decatur, Ill.

The Nukodol Co., Baltimore dealer in vegetable and mineral oils, obtains rights from Dr. Clarence Macks to process for deodorizing fish oils.

National Soybean Oil Manufacturers' trading rules are now in effect.

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The greatest threat to the nation's health is tuberculosis. It is the chief killer of men in industry between the ages of 15 and 45—20,000 men in this group alone die of it every year. No one is safe from the disease until every case has been found and placed under treatment. Help protect yourself and your family by using Christmas Seals on your holiday letters and packages. The funds they provide finance a program of prevention, discovery, and treatment of tuberculosis throughout the entire year.

The NATIONAL, STATE and LOCAL TUBERCULOSIS ASSOCIATIONS of the UNITED STATES

BUY CHRISTMAS SEALS

Solvents, Petroleum Chemicals

¶Ickes Threatens Oil Producers —Prices Steady—Alcohol Code Now Effective—

Federal Oil Administrator Ickes' speech suggesting possibility that the Government might declare the $14,000,000,000 oil industry a public utility, startled a gathering of 3,000 petroleum executives attending the Dallas meeting of the American Petroleum Institute. Speaking bluntly, and at times, sarcastically, he warned the industry that unless wasteful and uneconomic practices were not eliminated that its business might be taken away by an aroused public. "There is a strong case for this action," he asserted. "Oil affects the nation in a way no other natural resource of business does."

Speech unleashed a storm of reaction, ranging from bitter denunciation to wholehearted approval. Amos L. Beaty, chairman of the National Oil Planning and Co-ordination Committee, proposes a system of state compacts to control the oil industry—with Federal Government backstopping the states. Meanwhile, problem of "hot oil" remains with the Government admittedly "stumped", unable to properly "police" the industry's 300,000 wells.

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
No changes.		

DECLINED

Alcohol, solvent, drs.	$0.35½	$0.37½

DEPT. OF LABOR STATISTICS

	Oct.'34	Oct.'33	Sept.'34
Petroleum:			
Ref. employ. *a*	112.6	108.8	112.9
Ref. payrolls *a*	97.4	89.4	96.3
Products, prices *b*	50.4	52.7	51.3
Products, exports	$17,478*		$19,270*

* 000 omitted; *a* 1923-'25 = 100.0; *b* 1926 = 100.0.

Petroleum Solvents Steady

Despite a most unsettled state of affairs in the petroleum industry, petroleum solvents remain unchanged in price. Demand declined noticeably too, as lacquer and rubber tire production entered into the usual year-end slump. While tankcar and tankwagon prices generally were unchanged, one or 2 changes in tankwagons were reported. Early in the month local competition forced a small reduction in Stoddard Solvent in the Decatur, Ill., territory, bringing the level down to 15c; later, adjustments were made at Baltimore and Wilmington on petroleum thinner. As the month closed a reduction was made in petroleum thinner in tankcars at Baltimore. Aside from these rather minor changes, the market presented on Dec. 1 a fairly firm appearance in the face of a much lessened demand and considerable disorder in the basic industry. A decrease of 33,300 bbls. daily in the national allowable production of crude has been ordered by Secretary Ickes.

Seasonal Let-Up

Demand for most of the other solvents reflected the decline in production in the automotive centers, although prices continue to show exceptional strength. Butyl alcohol is decidedly firm with corn at higher levels. Anti-freeze business to date has been disappointing, due, of course, to the very mild spell that prevailed for a good part of the month over the Eastern states. Alcohol sales reflect this situation, but dealers are still optimistic. Synthetic methanol competition is on a greater scale this year, but this is likely to be offset somewhat by the higher price prevailing for glycerine. A year like last would supply enough business for all and the weather prognosticators still seem to be pretty much in agreement that the winter will make the previous one seem like a stay at Miami in February. An announced reduction in special solvent of 2c a gallon brings the quotations down to the actual market level generally prevailing in that item.

Alcohol Code Operating

Industrial Alcohol Industry Code (supplementary to the Chemical Manufacturing Industry (Code) is now effective. It is known as Code No. 275—Supplement No. 3. Approved code authority includes Glenn Haskell, U. S. I., as chairman, Lester Bacharach, Empire Distilling, M. F. Chase, Commercial Solvents, Harry E. Dunning, American Commercial Alcohol, C. Esteva, Puerto Rico Distilling, A. K. Hamilton, Pennsylvania Alcohol, who is vice-chairman, J. W. McLaughlin, Carbide, J. G. Park, Standard Alcohol, and J. J. Smith, Publicker Alcohol. Robert T. Baldwin is director and treasurer, and Miss Ruth E. Boyce is secretary of the Code Authority. Offices are located at 420 Lexington ave., N. Y. City.

The "products of the industry" as defined in the Code are: "Ethyl alcohol, denatured alcohol (including the product commercially known as "proprietary solvent') sold for industrial purposes, and ethyl alcohol, denatured alcohol, isopropyl alcohol and methyl alcohol (other than that produced from the destructive distillation of wood), or any product containing 70% or more of any of these materials, or any product containing a combination of 70% or more of any of these materials, sold for anti-freeze purposes by any member of the Industry."

Budget of $25,000.00 for the period Sept. 1, '34 to June 16, '35, and a rate of assessment of $0.0004 per wine gallon of net sales to the trade during the calendar year '34 of each and every product of the industry, have been approved by NRA. Exemption from the provisions of paragraph III of the Executive Order X-36 has been allowed the industry by NRA.

Open price provisions of the Code in conjunction with similar provisions adopted by the Hardwood Distillation Industry Code in amendment to the last named Code became effective on Nov. 8, '34.

Fine Chemicals

¶Mercury Schedule Established —Mercury Salts Lower—Brisk Demand—

Competition is advanced as the reason for the weakness and decline in calomel and corrosive sublimate rather than any weakness in mercury metal. In fact, steps taken last month by domestic producers to stabilize the market already has shown some results. A new price schedule has been announced as follows: 50 to 99 flasks, $73; 25 to 49, $73.50; 15 to 24, $74; 5 to 14, $74.50; and 1 to 4, $75. On the Pacific Coast the new price is given as $72.50 for 100 flasks, N. Y. delivery. It is expected that the above quotations will fluctuate with cartel quotations. Higher basic costs are responsible for the 10c increase in corn syrup prices. Another competitive article is cream of tartar and a 1c reduction was placed in effect in the middle of the month.

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
Corn syrup, 42°	$3.59	$3.49
43°	3.64	3.54

DECLINED

Calomel	$1.11	$1.16
Corrosive Sublimate	.73	.78
Cream of Tartar	.17¼	.18¼

DEPT. OF LABOR STATISTICS
(Drugs & Pharmaceuticals)

	Oct.'34	Oct.'33	Sept.'34
Price *a*	73.5	56.8	72.7
Exports	$957*		$914*

* 000 omitted; *a* 1926 = 100.0.

Fine chemical producers report without exception that December business was brisk. Seasonal items are moving out in satisfactory volume. The price structure is steady.

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60/62% K_2O

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Pharmaceutical—As a medicine. As a veterinary medicine. As an embalming fluid.

POTASSIUM CHROMATE

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Paint and Varnish—Making chromate pigments: in enamels.

Textile—As a mordant in printing and dyeing textile fabrics.

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Naval Stores

¶*Trading At a Standstill—Quota Approved — Stocks Accumulate At Ports—*

The spirits turpentine market has been at a standstill for a month and the same can be said with equal truthfulness of the gum rosin market. Sellers of turpentine have been holding firmly for 48c at primary points, while buyers have indicated that 45c was the very limit they would contract at. It is necessary to go back quite some time to find a month in naval stores history that has been quite so dull. Recourse to the month's statistics indicates how true this is. The price status of turpentine has been given. Rosin quotations at Savannah on Oct. 31 compare with the close Nov. 28 (last trading day) as follows:

	Oct. 31	Nov. 28	Net Gain and Loss
B	$4.10	$4.00	—$0.10
D	4.15	4.05	— .10
E	4.20	4.10	— .10
F	4.25	4.20	— .05
G	4.30	4.20	——
H	4.45	4.40	— .05
I	4.45	4.40	— .05
K	4.47½	4.40	— .07½
M	4.50	4.40	— .10
N	4.65	4.55	— .10
WG	5.00	4.85	— .15
WW	5.25	5.15	— .10
X	5.25	5.15	— .10

That stocks are accumulating at primary points need hardly be stressed. As yet no definite figures are available of what quantities are being held under Government advances, but the total must be considerable. Comparison of stocks at Savannah and Jacksonville follows:

STOCKS OF ROSIN

	Savannah	Jacksonville
End of October	135,098 bbls.	105,017 bbls.
End of November	127,337	121,991
Net gain or loss	— 7,761	+ 16,974
Net gain for the 2 ports		9,213 bbls.

STOCKS OF SPIRITS TURPENTINE

End of October	17,515	42,931
End of November	18,327	48,192
Net gain or loss	+ 812	+ 5,261
Net gain for both ports		6,073 bbls.

These preliminary statistics are only part of the story on stocks, for, while sales were at a standstill last month, shipments were fair. The nominal state of affairs in the past month will show up more definitely in the course of the next few weeks.

Approves 450,000 Units

Quota of 450,000 units as quantity of gum turpentine and gum rosin to be marketed for '35 by processors was approved Nov. 3 by Secretary of Agriculture Wallace. In this connection, it is necessary to mention that the Control Committee has announced that '34 tags are of no use after Dec. 31. This action rescinds formerly granted permission to extend use of '34 tags through next January and was taken at the insistence of Washington.

The following shows the total production of producers of steam and solvent products during October, and total stocks at plants at close of business on Oct. 31.

PRODUCTION

	Rosin, 500-lb. barrels	Turpentine, 50-gal. barrels	Pine Oil gallons
Month of October	39,785	6,288	300,544
Total from April 1, 1934	295,153	47,716	2,082,876

STOCKS AT PLANTS

Total October 31, 1934	109,812	18,504	
March 31, 1934	89,963	19,253	

NOTE—Rosin production and stocks include all grades of wood rosin.

DEPT. OF LABOR INDICES
(All Naval Stores Groups)

	Oct. '34	Oct. '33	Sept. '34
Employment *a*	89.3	103.9	96.2
Payrolls, *a*	45.1	48.3	96.2
Exports, naval stores, gums, resins	$920*		$1,327*

* 000 omitted; *a* 1923-'25 = 100.0.

Amended License

Secretary Wallace approves an amended license for the wood turpentine and wood rosin industry effective Dec. 5, A. A. A. announces. Amendment names the control committee for the license as follows:

S. L. Spitz, N. Y.; L. N. Bent, Wilmington, Del.; Dr. F. W. Kressman, Laurel, Miss.; George R. Tennant, Hopewell, Va., and R. L. Diggs, Jacksonville, Fla.

Asks For C. I. Exhibit

The Smithsonian Institute at Washington asks for the display of 300 new chemicals shown by CHEMICAL INDUSTRIES at the last Chemical Exposition. Display has been shown at various exhibits in the past year.

Business In N. Y. Area

N. Y. Credit Men's Association's weekly report on business indicates that chemical demand locally in the first week of November was under the comparable week of '33; in the 2nd week reports indicated an improvement over the first week of the month and demand better than the comparable week in '33;

Trade pace continued in the 3rd and 4th weeks, chemical sales showing increases over the corresponding weeks of last year.

Fertilizers

¶*Export Business Shoots Upward—Atlanta Meeting Well Attended — Raw Material Buying Light—*

Fertilizer exports in the first 9 months of '34 have increased in value substantially (60% above corresponding '33 period to $8,848,400) and in quantity, 30% to 926,000 tons, an amount almost equal in quantity to imports of fertilizer materials during the corresponding period.

TRADE EXPERT CONCANNON

Reports upturn in foreign fertilizer trade.

Chemical Trade Expert Concannon (chemical division head in the Bureau of Foreign and Domestic Commerce) reports that phosphate rock contributed substantially to this increase in '34 tonnage, gaining 23% in quantity to a total of 713,200 tons, and 45% in value to $3,557,000. Foreign demand for American phosphate has increased steadily since the beginning of '33, during which year exports totalled 750,000 tons as compared with 500,000 tons for '32. Among the reasons for this revival of our once almost supreme control of the phosphate rock markets of the world is listed the devaluation of the dollar.

Nitrogenous materials also figured prominently among fertilizer exports, increasing 75% in quantity to 138,500 tons and almost 89% in value to $3,557,000 compared with the 9-month period of '33. Notwithstanding large imports of potash into the U. S., exports of this fertilizer material have increased substantially in recent years due to certain transportation advantages and other factors.

Exports of American potash during the

Important Price Changes

ADVANCED

	Nov. 30	Oct. 31
Hoof Meal, Chicago	$2.30	$2.25
Tankage, fert. grd., Chicago	2.10	2.00

DECLINED

Blood, dried, imp.	$ 2.85	$ 3.00
Bone, raw, S. A. ship.	25.00	26.00
Castor pomace, imp.	19.50	20.00
Japanese, sardine meal	33.50	34.00
Nitrogenous, mat., imp.	2.60	2.65
Tankage, imp.	2.75	2.90

FERT. & FERT. MATERIALS

	Oct. '34	Sept. '34	Aug. '34
Exports	$1,429*	$1,271*	$1,059*
Imports	$1,684*	$1,554*	$1,035*

* 000 omitted.

DEPT. OF LABOR INDICES

	Oct. '34	Oct. '33	Sept. '34
Employment *a*	89.9	91.0	95.0
Payrolls *a*	71.9	68.4	78.5
Fert. mat. prices *b*	65.7	67.6	66.4
Mixed fert. *b*	73.0	68.3	73.0

a 1923-'25 = 100.0; *b* 1926 = 100.0.

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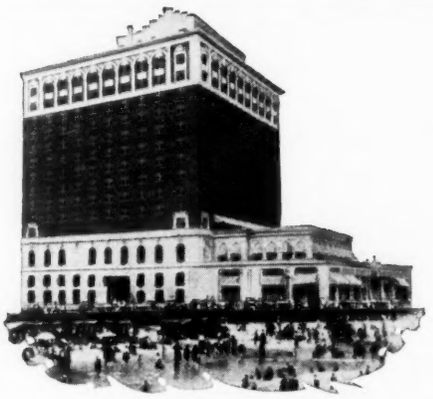

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Tennessee Corporation Lockland, O.

first 3 quarters of this year amounted to 19,200 tons, an increase of 3% over the corresponding period last year and the value advanced 15% to $744,650. This compares with only 1,816 tons, valued at $70,000, for the whole of '32. Japan is now the chief purchaser of American potash, with smaller quantities going to Canada, Cuba, and the Philippines.

Imports of fertilizer materials during the first 9 months of the year totalled 996,000 tons, valued at $20,917,000, an increase of 15% in quantity and 20% in value. Nitrogenous fertilizers were prominent among these materials accounting for 641,500 tons, an increase of 29% in quantity compared with the first 3 quarters of '33, but value increased only 4% to $9,742,000.

Imports of guano declined to 6,600 tons compared with 55,000 tons for the first 9 months of '33 and value declined from $1,012,000 to $147,000. Potash imports, valued at $6,454,000, changed only slightly in total value from imports during the '33 period; quantity increased 11% to 290,000 tons.

Sodium nitrate registered the outstanding gain among fertilizer imports increasing approximately 375% both in quantity and value to 268,000 tons valued at $5,138,000.

Industry Meets At Atlanta

NRA is credited by President Watson for substantially aiding recovery in the fertilizer industry, in his speech at the National Fertilizer Association's Atlanta convention. While not perfect, NRA has provided machinery for eliminating much of the destructive and harmful cut-throat competition which has been the bane of the industry for several years, he reported to an enthusiastic gathering of fertilizer executives. Objectionable features should be corrected, he believes, while the good should be permanently retained. Mr. Watson bans crop destruction as economically unsound. Cheers greeted his annoucement that he had had recent assurances from Washington that Muscle Shoals fertilizer development will be limited to experimental rather than commercial production of fertilizers on a large scale.

Reporting profits in place of yearly deficits, approximately 400 fertilizer executives present at Atlanta voiced and looked the picture of optimism. Aside from the benefits derived from the code, rising farm prices promise still better tonnages in the coming fertilizer year. Guest speaker was the Hon. M. L. Wilson, Assistant Secretary of Agriculture. Only discordant note was sounded by several speakers dealing with the labor problem. Labor scarcity is reported because workers on relief rolls prefer to remain in this status rather than to accept industrial employment. N.F.A. Secretary Brand discussed "The Recovery Program to Date."

Buying Dull

Purchasing of raw fertilizer materials remains extremely light. Mixers are holding aloof from the market until more definite news on the future of the Bankhead Control act is out. "Tell us what the cotton acreage is to be and we will know how much to buy" is the answer given in almost every instance when the question is asked "Why is business so dull?"

The market is interested, however, in the growing scarcity of nitrogenous material, especially in the Eastern centers. Nitrate and sulfate prices remain unchanged. Indications point to a growing scarcity of the latter and in many quarters higher prices are looked for before very long. Superphosphate producers are offering to take business for delivery after Jan. 1 at an advance of 50c, but as yet the buyers have shown little inclination to accept.

In general, the industry is resigned to a nominal price situation in most of the raw materials for the balance of the year. Not alone must crop figures for cotton be known, but tobacco and other commodities as well, before buyers can intelligently deal with their requirements. When buying does open up, however, it is expected in many directions, that the organic ammoniates will go higher, due to somewhat of a scarcity of stocks combined with a probable increase in demand.

Chemical Specialties

¶*Insecticide Meeting In N. Y. Will Attract Many—Cole Is Ill—*

Chemical specialty manufacturers are looking forward to two important conventions, the first, the semi-annual meeting of the National Association of Insecticide & Disinfectant Manufacturers, to be held at the McAlpin, Dec. 10-11 (a detailed program was given in the November issue, p448); the second, the Annual Convention and Exhibition of the National Association of Dyers and Cleaners scheduled for the Book-Cadillac in Detroit, Jan. 29-31. Space details are obtainable from the secretary at Silver Spring, Md.

New Products

Great American Tea (N. Y. City) is marketing Golden Key Washing Tablets and Golden Key Water Softener.

Durwyllan Co., Paterson, N. J., is marketing Dijit—a new hand soap.

St. Albans Pharmacal, N. Y. City, is introducing "Sulferan" a new dog soap.

Specialty Co. Notes

Founders Paint, Milwaukee, manufacturer of Lazy Man's Cleaner, places its advertising with Klau-Van Pietersom-Dunlap Associates, Milwaukee. Newspapers in 24 states will be used.

H. & H. Cleaner Co., Des Moines rug cleaning soap manufacturer, is in business 45 years.

Merck redesigns one of its best sellers. Merck's high standards are carried through to even the container.

In New Containers

Solarine Co. of Baltimore is shipping Old Sol Cleanser and Disinfectant in a specially molded bottle (a squatting elephant). Brockway Glass furnished the bottle and Armstrong Cork the stopper.

Wardell's Rex Products, Chicago, is dressing up Rex Mineral cleaning compound in a brand new designed box.

Cole Seriously Ill

Harry W. Cole, Baird & McGuire secretary, former secretary of the National Association of Insecticide & Disinfectant Manufacturers, and one of the most widely known men in the industry, is seriously ill at his home at Quincy, Mass.

Trade Marks

Pento Products, N. Y. City, is permitted to register "Pento" as a trade mark for a gasoline energizer, over the objections of Plough, Inc., who use "Penetroil" as a medicinal liniment and "Penetro" as a mouthwash.

Noxon Chemical Products is permitted to register as a trade mark for floor waxes and certain paints the word "Noxon" printed both horizontally and vertically within a circle. Bayer Co. protested, but Patent Commissioner L. Frazer held that no possibility of confusion is possible.

Worth Reading

C. H. Frankenburg, sales promotion manager, The Savogran Co., writes on "Window Display Gives Long Service—Copy Changes Keep It Alive By Featuring Related Products," appearing in *Printers' Ink Monthly* for November.

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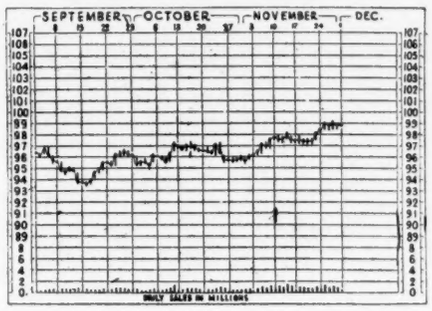
Chemical Finances

Values, Volume Rise

With improved sentiment again taking hold throughout the country the stock market shows signs of awakening from its persistent lethargy. November's trading was in greater volume than for any

Daily Record of Stock Market Trend



—*N. Y. Herald-Tribune*

month since July. Sales totaled 20,868,401 shares, compared with 15,661,431 in October and 33,645,736 in November, a year ago. Stocks moved upward irregularly during the month and prices toward the end of November reached the best levels since July. Gains in the *New York Times* combined averages amounted to $5.63, the widest for a month since January and the combined averages for the year at the end of the month showed a gain of 83c for the 11 month period as against a net loss of $4.80 for the first 10 months.

Market value of shares listed on the N. Y. Stock Exchange increased $2,274,674,904 during November, according to the monthly report issued by the Exchange. Total value of 1,186 issues, aggregating 1,304,936,095 shares on Dec. 1, was $33,888,023,435, compared with $31,613,348,531 on Nov. 1. On the latter date there were 1,188 issues, aggregating 1,305,416,543 shares.

Substantial Chemical Gains

Chemical stocks made substantial gains in the period under review. Market value on Dec. 1 totalled $3,907,175,656 as against $3,614,359,873 on Nov. 1, a gain of $292,815,783. This compares with a gain of $93,119,206 made in October. However, in October the gain in the chemical stocks was made in the face of a generally declining market. A loss of $6,054,901 in the chemical group was reported in September.

Company Earnings

American Cyanamid 9 months earnings are up slightly. Net income for the last 9 months after depletion, depreciation, research and process development expenses, interest, income taxes, minority interest and other charges amounted to $1,573,988 (62c a share on 2,520,373, $10 par shares of combined A and B, excluding shares held by subsidiaries). Comparable '33 figures were $1,520,373 and 60c. Earnings in the '34 September quarter reached only 20c a share against 39c in the 3rd quarter of '33. Figures are subject to year-end adjustments.

Net income of American Commercial Alcohol and wholly owned subsidiaries for 9 months ended on Sept. 30 amounted to $1,109,373, after interest, depreciation, provision for doubtful accounts, Federal taxes and other deductions. This is equivalent to $4.23 a share on 262,000 $20 par shares of capital stock. Statement has been compiled from the books of accounts of the several companies without audit and is necessarily based in part upon estimates. Figures are subject to audit, year-end adjustments and physical inventory adjustments as of Dec. 31, '34.

In the first 9 months of '33 company showed a net income of $218,513, equal to 84c a common share.

Archer-Daniels-Midland's report indicates that the Government's housing and rehabilitation schemes have not as yet had any effect on earnings. Substantial increase for the September quarter for this leading linseed oil producer is due to improvement in the company's business generally and to greater plant activity resulting in more efficient operations. First quarter earnings of the fiscal year totalled $529,528 (86c a share on the common), as against $364,302 (55c a share) in the quarter ending Sept. 30, '33.

Columbian Carbon's net for first 9 months of this year is up sharply when compared with the same period a year ago, figures being $1,661,651 ($3.08 a share) for '34 and $777,978 ($1.44) for '33. Comparison of 3rd quarter earnings show an increase for '34. Preliminary figures indicate a net profit for the '34 period of $476,122 (88c a share) against $291,678 (54c) in the 3rd quarter of '33. In the 2nd quarter of '34, however, a net of $627,529 ($1.16) was reported.

United Chemical's Loss

United Chemicals reports a net loss of $18,847 after taxes and charges compared with net loss of $23,835 in the preceding quarter and net loss of $25,382 in the September quarter of '33.

Nickel Earns 24c

International Nickel in the last quarter earned $4,005,166 (24c a share on the common) compared with $4,963,366 or 31c a share in the preceding quarter and $3,773,130 or 22c in the September quarter of the previous year.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Abbott Laboratories	50c	Dec. 18	Jan. 2
Abbott Laboratories ext.	15c	Dec. 18	Jan. 2
Allied Chem. pf.	$1.75	Dec. 11	Jan. 2
Amer. Agric. Chem.	50c	Dec. 10	Dec. 31
Archer-Daniels-Midland	25c	Nov. 20	Dec. 1
Archer-Daniels-Spec.	25c	Nov. 20	Dec. 1
Atlas Powder	50c	Nov. 30	Dec. 10
Clorox Chemical	50c	Dec. 18	Dec. 28
Colgate-Palmolive-Peet	12½c	Nov. 8	Dec. 1
Colgate-Palmolive-Peet ext.	25c	Nov. 8	Dec. 1
Colgate-Palmolive-Peet pf.	$1.75	Nov. 16	Dec. 1
Columbian Carbon.	85c	Nov. 15	Dec. 1
du Pont	65c	Nov. 28	Dec. 15
du Pont ext.	15c	Nov. 28	Dec. 15
du Pont, deb.	$1.50	Jan. 10	Jan. 25
Freeport Texas	50c	Nov. 15	Dec. 1
Freeport Texas pf.	$1.50	Jan. 15	Feb. 1
Gold Dust pf.	$1.50	Dec. 17	Dec. 31
Hercules Powder	75c	Dec. 10	Dec. 31
Hercules Powder ext.	75c	Dec. 10	Dec. 21
Heyden Chemical	25c	Nov. 26	Dec. 1
Heyden Chemical ext.	25c	Nov. 26	Jan. 2
Heyden Chemical pf.	$1.75	Dec. 26	Jan. 2
Int'l Nickel	15c	Dec. 1	Dec. 31
Int'l Salt	37½c	Dec. 15	Jan. 2
Koppers Gas & Coke 6% cum. pf.	$1.50	Dec. 12	Jan. 2
Mathieson Alkali	37½c	Dec. 10	Jan. 2
Mathieson Alkali pf.	$1.75	Dec. 10	Jan. 2
Monroe Chemical	50c	Dec. 10	Dec. 24
Monroe Chemical pf.	87½c	Dec. 15	Jan. 1
Monsanto Chemical	25c	Nov. 24	Dec. 15
Monsanto Chemical ext.	25c	Nov. 24	Dec. 15
Monsanto Chemical pf.	87½c	Dec. 15	Jan. 1
National Lead	$1.25	Dec. 14	Dec. 31
National Lead Cl. B	$1.50	Jan 18	Feb. 1
National Lead pf. A	$1.75	Nov. 30	Dec. 15
Patterson Sargent	25c	Nov. 21	Dec. 1
Patterson Sargent ext.	12½c	Nov. 21	Dec. 1
Penick & Ford	75c	Dec. 1	Dec 15
Penick & Ford ext.	75c	Dec. 1	Dec. 15
Procter & Gamble ext.	20c	Nov. 23	Dec 15
Procter & Gamble 5%	$1.25	Nov. 23	Dec. 15
Sherwin-Williams pf.	$1.50	Nov. 15	Dec. 1
Spencer Kellogg	40c	Dec. 15	Dec. 31
Texas Gulf Sulphur	50c	Dec. 1	Dec 15
Union Carbide	35c	Dec. 6	Jan. 1
United Carbon	60c	Dec. 15	Jan. 1
United Dyewood pf.	$1.75	Dec. 15	Jan. 2
Westvaco Chlorine	10c	Nov. 15	Dec. 1

Price Trend of Chemical Company Stocks

	Oct. 31	Nov. 2	Nov. 9	Nov. 17	Nov. 24	Nov. 30	Net Change	1934 High	1934 Low	1933 High	1933 Low
Air Reduction	103⅞	102⅞	106	109	112⅝	112½	+8⅝	113	91¾	112	47½
Allied Chem...	127	127¾	134	134½	135¼	136	+9	160¾	115⅛	152	70¼
Anaconda ...	10⅞	10⅛	11	10⅝	10¼	11	+ ⅛	17¾	10	22⅞	5
Col. Carbon ..	66¼	68¼	72⅞	72½	74	73¼	+7	77¼	58	71½	23⅛
Com. Solvents	18¼	18¾	20⅞	21⅜	21⅝	21⅛	+2⅞	36¼	15¾	57¾	9
du Pont	92¼	92⅜	96¼	96½	98¾	98¼	+6½	103⅞	80	96⅜	32⅛
Mathieson ...	24⅛	24½	27	26¼	28¾	29½	+5⅜	40¾	23½	46⅝	14
Monsanto	55⅛	54⅝	57⅝	58	60½	60	+4⅞	61⅝	39	83‡	25‡
Std. of N. J.	40¾	40⅞	43	43⅛	42⅛	42⅞	+2½	50⅛	39¼	47½	22¾
Texas Gulf S.	36½	36⅜	36	35¾	35⅞	35¼	+1¼	43¼	30	45¼	15¼
Union Carbide	43	43½	45	44¾	45¼	45⅞	+2⅞	55⅞	35⅞	.....	.....
U. S. I.	37	37⅝	42½	41⅝	44⅛	43¼	+6¼	64¾	32	94	13½

‡ Old stock.

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Standard Chemical, Ltd., and Subsidiaries for 6 months ended Sept. 30 show net loss after expenses and other charges, but before depreciation, $35,578, against $85,633 loss before depreciation in same period a year before.

Earnings Analyzed

Eastman, Dillon's analysis of 3rd quarter corporation earnings shows that 15 leading chemical companies netted $25,-203,455 in '34 compared with $23,765,081 in the corresponding period of '33, a net increase of 6%. Total for 263 American corporations showed in the same period a 25% decline, from $218,059,221 in 3rd quarter of '33 to only $162,034,660 in the 3rd quarter of this year. Chemical earnings for the first 9 months of '34 are substantially ahead of the figures for the same period of last year.

Dividend News

Prominent chemical companies' names feature news reports on dividend extras. Included were Penick & Ford with an extra 75c, in addition to a quarterly payment of like amount, placing stock on a $3 basis; a 25c extra by U. S. Gypsum; a 25c extra by Heyden Chemical; and a $13 extra by Great Western Electro Chemical; du Pont with a 15c extra in addition to the regular 65c on the common; 3 months ago a special 50c dividend was declared; Patterson Sargent with a 12½c extra to the 25c regular.

Cyanamid directors Dec. 4 declare a dividend of 10c per share payable Jan. 2, '35 to holders of Class "A" and Class "B" shares of the common stock of record at the close of business Dec. 15, out of the available surplus and undivided profits. While the directors consider it unwise at this time to establish a dividend basis or policy for the future, it is their anticipation that, if business does not decline from present levels, dividend payments will be made quarterly.

Hercules Powder directors declare a quarterly dividend of 75c a share and an extra dividend of 75c a share on the company's common stock. Dividend is payable Dec. 21 to stockholders of record Dec. 10. This makes a total of $3.50 dividend on each share of common for '34.

Nor were these all of the extras in the chemical and allied fields. Eastman Kodak declares a 75c extra, the last 75c extra was paid Jan. 2, '32; Columbian Carbon declares a special Christmas dividend of 20c, payable Dec. 24, to voting trust certificate holders. Special dividend brings total dividends this year to $3.20, compared with $2 for '33, $2.50 for '32, and $5 for '31.

Pittsburgh Plate Glass declares a quarterly dividend of 40c, payable Jan. 2 to stock of record Dec. 10. In the previous quarter a dividend of 35c was paid. President H. S. Werrett reports:

"The present increased activity of the automobile manufacturers and the greater demand for Duplate safety plate glass indicate a considerable improvement in the output of this important product of the company during the early months of '35."

Glidden declares an extra of 15c on the common and the regular quarterly dividends of 25c on the common and $1.75 on the prior preference stocks, all payable Jan. 2 to stock of record Dec. 14. A similar extra was paid 3 months ago.*

* Other extra declarations included one of $1.50 by Canadian Industries, 25c by Liquid Carbonic, and 25c on A & B by Devoe & Raynolds.

SEC Registrations

Securities and Exchange Commission reports following registration:

Sigua Manganese Corp. (2-1117, For A-1, Refiling), manganese producing, treating and shipping company operating properties in Cuba, proposing to issue 25,000 shares of $10 par value common at $10 a share. Luis Batlle, Santiago, Cuba, is president; Collins Securities Co., N. Y. C., is underwriter.

Foreign Markets

	Oct. 3	Oct. 31	Nov. 30
London			
British Celanese	12s	10½d	10s 9d
Celanese	£4¾	£5¼	£6
Courtaulds	47s 4½d	45s 10½d	47s
Distillers		91s	93s 9d
I. C. I.	36s 10½d	34s 10½d	37s 3d
Unilever, ord.	23s	22s 3d	24s
Un Molasses	21s 7½d	19s 4½d	19s
Paris			
Kuhlmann	481	494	
L'Air Liquide	590	590	610
Berlin			
I. G. Farben	144	141	135
Milan			
Snia Viscosa	271½	.....	.....
Montecatini	168	136	133

Over the Counter Prices

	Oct. 3		Oct. 31		Nov. 30	
Am. Hard Rubber	5½	8	5	8	5	8
Canadian Celanese, com.	15¼	17¾	20¼	23¼	18	20
Canadian Celanese, pfd.	107½	110½	118	122	118½	121
Dixon Crucible	38	44	39½	44	43	48
Merck, pfd.	122	125	125	127	130	.....
Tubize Chat., 7% cum. pfd.	44½	47½	37	41	37	41
Worcester Salt	44	49	45	49	45½	49
Young, J. S., pfd.	100	.....	100⅞	.....	101½	.....
Young, J. S., com.	72¼	.....	72½	.....	77	.....

Financial Notes

A stockholders' suit to reorganize Furness Corp., a manufacturer of rayon in Gloucester, N. J., under the Federal bankruptcy act, has been started in the U. S. District Court at Camden. Judge John Boyd Avis appoints Alexander L. Rodgers of Woodbury as permanent trustee.

Plan for simplification of the Merck Corp. capital structure, which would provide for consolidation with its operating subsidiary, Merck & Co., and would make possible caring for accumulated dividends on preferred of the parent company, will be voted on by stockholders soon. Accumulated dividends amount to 34%.

Plans for early reorganization of Davison Chemical are initiated by filing in U. S. District Court, Baltimore, of a creditors petition proposing adjustment of the affairs of that Company under Section 77B of the new Corporate Reorganization Act.

Dow calls for redemption Feb. 1 outstanding 10-year 6% gold notes at 101 plus accrued interest.

Chemical bond values (N. Y. Stock Exchange listings) totalled $89,923,692 Dec. 1, compared with $86,793,333, an increase of $3,130,359. Average price Dec. 1 was $93.22, compared with $89.97 Nov. 1.

Earnings Statements Summarized

Company	Annual dividends	Net income 1934	Net income 1933	Common share earnings 1934	Common share earnings 1933	Surplus after dividends 1934	Surplus after dividends 1933
Am. Agricultural Chem. of Del.:							
Sept. quarter	$2.00	†$ 102,456	†$ 231,909	....	....	.....	.....
Am. Commercial Alcohol:							
Nine months, Sept. 30	f...	1,109,373	.....	$4.23	....	.....	.....
American Cyanamid:							
††Sept. 30 quarter	k$ .25	507,842	977,544	h.20	h$ .39	.....	.....
Nine months, Sept. 30	k.25	1,573,988	1,500,811	h.62	h.60	.....	.....
American Metal Co.:							
Sept. 30 quarter	f...	†143,719	104,010	....	p1.56	.....	.....
Nine months, Sept. 30	f...	†357,913	38,041	....	p.51	.....	.....
Archer-Daniels-Midland:							
Sept. 30 quarter	§1.00	529,528	364,302	.86	.55	*.....	*.....
Continental-Diamond Fibre:							
Sept. 30 quarter	f...	†18,338	15,375	....	.03	.....	.....
Nine months, Sept. 30	f...	†78,324	†145,065	....	....	.....	.....
Formica Insulation:							
Sept. 30 quarter	f...	5,444	25,980	.03	.14	.....	.....
Nine months, Sept. 30	f...	31,949	†7,272	.18	....	.....	.....
Mathieson Alkali:							
Sept. 30 quarter	1.50	278,311	415,667	h.29	h.60	*.....	*.....
Nine months, Sept. 30	1.50	895,736	919,350	h.93	h1.27	*.....	*.....
New Jersey Zinc:							
Sept. 30 quarter	2.00	746,637	1,514,909	.38	.77	d234,994	533,277
Nine months, Sept. 30	2.00	2,833,149	2,885,290	1.44	1.47	d111,747	d659,606
Penick & Ford:							
Sept. 30 quarter	2.00	412,177	351,081	1.05	.88	*.....	*.....
Nine months, Sept. 30	2.00	901,257	1,048,671	2.31	2.62	*.....	*.....
Sherwin-Williams Co. of Canada, Ltd.:							
Year, Aug. 31	f...	200,805	†20,456	p5.80	....	.....	.....
Texas Gulf Sulphur:							
Sept. 30 quarter	2.00	1,899,155	2,611,362	.75	1.03	.....	.....
United Chemicals, Inc.:							
††Sept. 30 quarter	f...	†18,847	†25,382	....	....	.....	.....
Nine months, Sept. 30	f...	†66,784	†104,602	....	....	.....	.....

† Net loss; f No common dividend; k Declared in '34; h On shares outstanding at close of respective periods; § Plus extras; d Deficit; * Not available; †† Profit before Federal taxes.

Chemical Stocks and Bonds

1934 November Last	High	Low	1933 High	Low	1932 High	Low	Sales	Stocks	Par $	Shares Listed	An. Rate*	Earnings $-per share-$ 1933	1932
NEW YORK STOCK EXCHANGE							Number of shares 1934	November					
112½	113	91¾	112	47½	63½	30⅞	186,100	15,500	Air Reduction	No	841,288	$4.50	3.79	2.73
136	160¾	115⅛	152	70¾	88¼	42½	272,500	16,900	Allied Chem. & Dye	No	2,214,099	6.00	5.50	3.62
129	130	122⅛	125	115	120†	96½	9,800	700	7% cum. pf.	100	345,540	7.00	42.24	29.12
46¼	48	25¼	35	7¼	15½	3½	199,200	5,700	Amer. Agric. Chem.	100	315,701	2.00	*p*4.19	*p*—1.61
32½	62½	20¾	89⅞	13	27	11	250,100	56,600	Amer. Com. Alcohol	20	260,716	None	4.56	3.01
38	38⅜	26¼	29¼	9¾	15½	7	108,100	12,700	Archer-Dan-Midland	No	541,546	1.50	*p*3.82	*p*1.79
43⅛	55½	35¼	39⅛	9	25½	7	86,700	9,300	Atlas Powder Co.	No	234,235	2.00	.74	—2.06
105⅞	105⅞	83	83⅛	60	79½	45½	6,290	270	6% cum. pfd.	100	88,781	6.00	8.38	.47
30¼	44⅞	17⅛	58⅞	4½	12⅝	1¼	1,285,200	126,700	Celanese Corp. Amer.	No	987,800	None	3.32	— .95
17⅜	18⅛	9⅜	22⅜	7	31½	10¼	758,900	41,300	Colgate-Palm.-Peet	No	1,985,812	.75	— .57	— .74
101	101	68½	88	49	95	65	17,000	4,400	6% pfd.	100	254,500	6.00	1.51	.21
73¼	77¼	58	71½	23⅛	41⅞	13½	311,100	17,400	Columbian Carbon	No	538,154	3.40	2.17	1.83
21⅛	36¾	15¾	57¼	9	13¾	3½	2,566,900	106,200	Commer. Solvents	No	2,635,371	.60	.88	.51
68	84½	55½	90⅝	45⅜	55⅜	24¾	359,600	24,700	Corn Products	25	2,530,000	3.00	3.87	2.77
148	150	135	145¾	117½	140	99½	8,300	400	7% cum. pfd.	100	243,739	7.00	46.02	35.05
52	55⅛	29	33⅞	10	16¾	7	81,300	8,700	Devoe & Rayn. A	No	95,000	3.00	3.82	*r*—1.00
98¾	103⅞	80	95⅞	32⅛	59¾	22	1,428,000	96,000	DuPont de Nemours	20	10,871,997	3.15	2.93	1.81
127	127½	115	117	97½	105⅛	80¾	21,100	3,000	6% cum. deb.	100	1,092,699	6.00	35.58	24.00
112¼	116½	79	89¾	46	87¾	35¼	221,700	21,700	Eastman Kodak	No	2,250,921	4.00	4.76	2.52
140	147	120	130	110	125	99	2,780	260	6% cum. pfd.	100	61,657	6.00	180.34	98.27
27½	50⅜	21½	49⅜	16⅛	28⅝	10	313,700	18,900	Freeport Texas	10	784,664	2.00	3.01	2.75
115	160⅛	113½	160⅛	97	...	...	2,900	100	6% conv. pfd.	100	25,000	6.00	156.73	.....
27⅝	28⅜	15⅝	20	3¾	10⅜	3⅛	775,900	42,700	Glidden Co.	No	603,304	1.15	1.54	*s*— .06
107	107	83	91½	48	76	35	13,705	800	Glidden, 6% pfd.	100	63,044	7.00	22.60	7.85
86	96⅞	74	85⅞	65	...	...	52,700	7,100	Hazel Atlas	25	434,409	5.00	6.22	4.68
79	81⅝	59	68⅝	15	29½	13⅞	93,600	6,900	Hercules Powder	No	582,679	3.00	2.79	.24
123¼	125	111	110⅛	85	95	70½	4,780	400	7% cum. pfd.	100	105,765	7.00	22.38	8.39
26	30½	19⅜	85	24	40	7⅛	645,400	22,600	Industrial Rayon	No	600,000	1.68	3.01	.55
4¼	6⅛	2	5⅞	⅞	3½	¼	268,100	15,400	Intern. Agricul.	No	436,049	None	*p* .69	*p*—4.04
31½	37¼	15	23½	5	15	3¾	36,600	2,900	7% cum. pr. pfd.	100	100,000	None	*p*4.00	*p*—10.60
23½	29¼	21	23¼	6¾	12½	3½	2,993,200	113,900	Intern. Nickel	No	14,584,025	.60	.53	— .14
30½	32	21	27¾	13¾	23½	9¾	47,600	1,900	Intern. Salt	No	240,000	1.50	2.04	2.14
31⅜	32½	15¾	22	7½	11	8	64,900	8,500	Kellogg (Spencer)	No	500,000	1.60	.98	*v*— .26
28½	43⅞	22½	37⅜	4⅜	9⅜	3¾	844,700	64,700	Libbey Owens Ford	No	2,559,042	1.20	1.64	— .13
23⅜	35⅜	16⅛	50	10¼	22	9	248,900	15,200	Liquid Carbonic	No	342,406	1.25	*v*1.05	*u*—1.29
29½	40¾	23½	46⅝	14	20⅞	9	486,900	44,600	Mathieson Alkali	No	650,436	1.50	1.70	.86
60	61⅝	39	83	25	30¾	13⅜	206,600	19,000	Monsanto Chem.	10	864,000	1.25	2.57	1.18
157	163	135	140	43¼	92	45	33,700	3,200	National Lead	100	309,831	5.00	6.98	3.15
141½	145	122	128¼	101	125	87	5,100	400	7% cum. "A" pfd	100	243,676	7.00	18.35	13.55
118½	118½	100½	109⅛	75	105	61	2,890	740	6% cum. "B" pfd.	100	103,277	6.00	30.45	15.45
7	13	5½	11¾	1⅜	3¾	1½	147,100	10,100	Newport Industries	1	519,347	None	.05	— .68
84½	94	60	96¾	31½	42¼	12	145,000	12,700	Owens-Illinois Glass	25	1,200,000	4.00	4.86	1.62
43½	44⅜	33⅛	47½	19⅝	42¾	19⅞	317,500	42,900	Procter & Gamble	No	6,410,000	1.70	1.52	*q*1.20
114⅛	117	102½	110¾	97	103½	81	6,875	1,040	5% pfd. (ser. 2-1-29)	100	171,569	5.00	61.95	52.16
4⅞	6¾	3⅛	7¼	1⅜	4⅜	1	105,100	11,600	Tenn. Corp.	5	857,896	None	— .11	— .89
35¼	43¼	30	45¼	15¼	26¾	12	682,300	48,500	Texas Gulf Sulphur	No	2,540,000	2.00	2.93	2.33
45⅞	50⅞	35⅞	51⅞	19¾	36⅜	15½	1,035,200	76,800	Union Carbide & Carbon	No	9,000,743	1.40	1.59	.98
49⅜	49⅜	35	37¾	10¼	18	6⅝	253,600	28,000	United Carbon	No	370,127	2.40	1.39	— .05
43¾	64¾	32	94	13½	36¼	13¼	347,400	28,700	U. S. Indus. Alco.	No	391,033	None	3.56	.47
19⅞	31¾	14	36¼	7⅝	23¾	5¼	535,900	20,000	Vanadium Corp.-Amer.	No	366,637	None	—2.40	—4.36
3⅝	5⅜	1⅞	7⅜	⅝	2⅜	½	251,600	23,700	Virginia-Caro. Chem.	No	486,000	None	*p*—2.46	*p*—5.06
20	26	10	26½	3⅛	11¼	3⅛	91,700	5,700	6% cum. part. pfd.	100	213,392	None	*p* .52	*p*—5.54
80	84	59¼	63½	35⅜	69¾	20	5,360	300	7% cum. prior pfd.	100	60,000	None	*p*9.06	*p*—12.71
21	27¼	14⅞	20½	5	12⅝	3	133,150	5,300	Westvaco Chlorine	No	284,962	.40	1.08	.79
NEW YORK CURB EXCHANGE														
17¼	22½	14¾	16½	3¼	8½	1⅝	152,400	33,900	Amer. Cyanamid "B"	No	2,404,194	*m* .25	.99	.14
2½	4⅛	2⅜	4½	1	2⅛	¾	30,700	600	British Celanese Am. R.C.R.	243	.....	None	.....	.....
97	104¼	81	110	27	55	8	16,150	6,225	Celanese, 7% cum. 1st pfd.	100	144,379	7.00	32.24	.60
95	98½	83	90	51	64¼	17	5,425	1,550	7% cum. prior pfd.	100	113,668	7.00	47.98	7.77
15¼	19	7	26⅞	2	5⅜	1½	23,875	3,900	Celluloid Corp.	15	194,952	None	—1.00	—3.79
12⅛	14⅜	10½	11⅝	4⅛	6⅞	4½	18,000	300	Courtaulds' Ltd.	1 £	24,000,000	4½%	....	.....
80	80½	67½	78	30	39	21½	68,600	10,000	Dow Chemical	No	945,000	2.00	†3.60	†1.33
5⅞	10¼	4	8	½	1½	¼	54,300	1,300	Duval Texas Sulphur	No	500,000	None	*z* .08	*z*— .17
39¾	40¾	19	19	8	...	..	18,700	2,100	Heyden Chem. Corp.	10	147,600	1.35	2.68	1.23
53	57½	39	39⅞	13	19½	12⅛	22,890	11,580	Pittsburgh Plate Glass	25	2,141,305	1.40	1.87	— .03
83¼	84	47¼	47	12⅞	35	17½	38,475	17,375	Sherwin Williams	25	635,583	3.00	*y*3.54	— .44
109½	109¾	100	99	80	100⅛	75	2,120	220	6% pfd. AA. cum.	100	155,521	6.00	*y*20.78	4.52
CLEVELAND STOCK EXCHANGE														
80	80½	67½	78	30	40	21½	9,768	515	Dow Chemical	No	945,000	2.00	†3.60	†1.33
PHILADELPHIA STOCK EXCHANGE														
72	72	50¼	57	25¼	40	19⅞	3,190	415	Pennsylvania Salt	50	150,000	3.00	2.17	2.42

1934 November Last	High	Low	1933 High	Low	1932 High	Low	Sales	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE							1934	November				
102⅜	104	83⅞	89	64	80	54¼	4,522,000	523,000	Amer. I. G. Chem. Conv. 5½'s	1949	5½	M. N.	29,929,000
10⅛	17¾	5	14⅛	2⅛	18	1	3,089,000	123,000	Anglo Chilean s. f. deb. 7's	1945	7	M. N.	12,700,000
80½	88	61½	74⅞	37	60	34½	469,000	68,000	By-Products Coke Corp. 1st 5½'s "A"	1945	5½	M. N.	4,932,000
91½	91¾	62	65	38½	54⅞	32	384,000	112,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5	M. N.	5,994,100
10¾	19½	5⅛	14⅞	2½	15¼	¼	12,106,000	396,000	Lautaro Nitrate conv. b's	1954	6	J. J.	31,357,000
97	98½	90	99⅛	87	97¾	67	605,000	37,000	Montecatini Min & Agric. det. 7's with war.	1937	7	J. J.	7,075,045
44	74½	44	62	33¾	59	17	414,000	.....	Ruhr Chem. 6's	1948	6	A. O.	3,156,000
86	88¼	65½	76	50	66	39	209,000	1,000	Tenn. Corp. deb. 6's "B"	1944	6	M. S.	3,007,900
84⅜	89½	62	81	34¾	75	30	539,000	67,000	Vanadium Corp. conv. 5's	1941	5	A. O.	4,261,000
NEW YORK CURB EXCHANGE													
103¼	104¼	101⅜	103½	101	103⅛	99	94,000	5,000	Westvaco Chlorine Prod. 5½'s	1937	5½	M. S.	1,393,000

† Years ended 5-31-33-& 34; *m* Last paid, no regular rate; *p* Years ended 6-30-33 and 6-30-34; *r* Year ended 11-30-32; *s* Years ended 10-31-32 & 33; *u* Year ended 9-30-32; *v* Years ended 9-2-32 & 33; *x* Years ended 5-31-32 & 33; *y* Year ended 8-31-33; *z* Years ended 8-31-33, and 8-31-34; * Including extras.

Industrial Trends

Business Improves

The upswing in business continues at an encouragingly and increasingly accelerated pace. Sentiment in the last few weeks has undergone a change for the better and business and the Government appear at the moment to be closer to real cooperation than at any other previous period since the Administration assumed control in Washington.

The budget problem remains, however, and the country is awaiting the announcement of future fiscal policies with frank concern.

Retail Trade Encouraging

Retail trade trend is encouraging. A survey among department stores in 30 states by the National Retail Dry Goods Association indicates December sales will exceed last year's sales by about 11% will top '32 by 22%; and will almost equal '31. November sales are thought to have run between 8 and 11% above November a year ago, although warm weather in certain sections tended to discourage buying of winter necessities. Wholesale collection conditions held their own in November as compared with October but sales showed a slight decline, according to the December survey of the National Association of Credit Men. Compared with last year at the same time the survey shows considerable improvement in both sales and collections.

The heavy industries also show signs of reviving. Steel operations have increased for 6 consecutive weeks and are reported at 28.1% of capacity, the highest rate since July 16, and comparing favorably with the rate of 26.8% reported for the week of Nov. 27, '33. Automotive production is naturally down at the traditionally seasonal low point but the building trades are slightly more optimistic. Other industries show progress. *The American Glass Review* reports that glass manufacture is now at its most encouraging point since early in the year. While operations in the paint, tanning and rubber industries are likely to remain rather dull in December, all signs point to a very early revival in these fields with the turn of the new year. Cotton cloth production is holding at a very satisfactory rate except in parts of New England, and a settlement in the dyers' strike, which at the time this is written seems imminent after 4 weeks of idleness and destruction in the Paterson area, would unquestionably speed up activity tremendously for a large backlog has been rapidly accumulating.

Power Output Gains

Power output gains are pronounced. In the week ending Nov. 24 the total was 6.1% above the corresponding period last year. Export trade shows encouraging gains too, October exports of $206,352,000 are up 8% in a month, are $13,283,000 better than a year ago, while the total for the first 10 months of '34 exceed the corresponding '33 period by 36%. October exports exceeded imports by $76,700,000 and was the best month since April, '31. Freight car loadings, on the other hand, are running approximately 3 to 4% below last year's totals. *The New York Times'* Index of Business Activity early in November crossed last year's level for the first time in 5 months and continued to gain throughout the remainder of the month. On Nov. 24 it stood at 76.3, compared with 73.9 on Nov. 25, '33.

Commodity Prices Higher

Movement in commodity prices was mixed last month, zinc and lead, depressed by large stocks, making new '34 lows; corn, lard, cottonseed oil, tin and silver remaining steady. U. S. Bureau of Labor's wholesale commodity price index on Nov. 24 was 28% above the low point of '33 (Mar. 4) and 21% below the '29 peak made in July. Present prices are 2% below the high point of the present year (Sept. 8) and 7½% above the '34 low (Jan. 6) when the index was 71.0. Compared with the month previous prices are up by 0.1 of 1%; they are 7½% higher than in the corresponding week of '33 and 19% above '32. Dun's index of commodity prices shows advance of 1¼% in November, following a decline of 1⅛% in October.

Employment and payroll totals which showed losses in September over August turned upward again in October and this trend was continued in November, preliminary estimates indicate.

Chemicals, contrary to seasonal trend, were in better demand in November than in October. A quiet, orderly contract season, with prices in the overwhelming majority of items firm, is giving confidence to both maker and seller.

Statistics of Business

	October 1934	October 1933	September 1934	September 1933	August 1934	August 1933
Auto production	132,488	134,683	168,872	191,800	234,809	232,855
Bldg. contracts*‡	$135,524	$145,367	$110,151	$120,134	$120,269	$105,989
Failures, Dun & Bradstreet	1,091	1,206	790	1,116	929	1,472
Merchandise imports‡	$129,629	$150,867	$131,659	$146,643	$119,515	$154,918
Merchandise exports‡	$206,352	$193,069	$191,690	$160,119	$171,965	$131,473
Newsprint Production						
Canada, tons	235,021	191,452	196,172	179,416	216,164	194,262
U. S., tons	80,572	82,052	74,117	72,907	80,903	84,521
Newfoundland, tons	25,321	.....	25,847	23,701	30,223	24,826
Total, tons	342,867	.....	297,886	277,033	329,158	305,242
Newsprint Shipments						
Canada, tons	.....	.....	195,320	183,971	209,938	194,354
U. S., tons	.....	.....	70,941	75,008	90,482	82,503
Total (U. S. & Can.)	.....	.....	266,261	258,979	300,420	276,857
Plate Glass prod., sq. ft.	.....	.....	.....	.....	7,449,906	16,326,618
Shoe production, pairs	.....	.....	27,794,162	31,234,116	35,469,259	37,019,170
Steel ingots	1,461,932	2,084,892	1,251,530	2,283,079	1,363,359	2,863,569
Steel activity, % of capacity	24.59	36.89	22.74	40.40	22.93	48.79
U. S. consumption crude rubber, tons	31,347	31,543	30,352	35,281	33,316	44,428
Tire shipments	.....	.....	3,182,908	3,503,365	4,308,270	4,707,085
Tire production	.....	.....	2,935,958	3,999,239	3,632,631	4,993,609
Tire inventory	.....	.....	8,418,906	7,594,506	8,697,151	7,069,574
Factory payrolls, totals†	60.7	59.4	57.9	59.1	62.2	56.8
Factory employment†	78.6	79.6	75.8	80.0	79.4	63.4
Dept. of Labor Indices						
Chemical price index†	.....	.....	80.3	78.8	.....	.....
Chemical employment†*a*	109.2	109.1	108.6	.....	.....	.....
Chemical payrolls†*a*	91.2	85.5	89.9	.....	.....	.....
Chemicals and Related Products						
Imports‡	$7,793	.....	$4,184	.....	$3,917	.....
Exports	$4,955	.....	$7,737	.....	$7,722	.....
Stocks, mfd. goods†	.....	.....	.....	120	121	112
Stocks,, raw materials†	.....	.....	.....	104	88	88

Week Ending	Carloadings 1934	Carloadings 1933	Carloadings % of Change	Electrical Output 1934*b*	Electrical Output 1933*b*	Electrical Output % of Change	Jour. of Com. Price Index	National Fertilizer Association Indices: Metals	Fats & Oils	Chem. & Drugs	Mixed Fert.	Fert. Mat.	All Groups	Labor Dept. Chem. & Drug Price Index	% Steel Activity	Fisher's Index Purch. Power	N. Y. Times Index Bus. Act.
Oct. 27	624,252	642,423	—2.8	1,677,229	1,621,702	+3.4	75.6	81.7	62.8	93.7	74.6	65.2	74.3	77.2	25.0	126.9	75.3
Nov. 3	612,457	614,136	—0.3	1,669,217	1,583,412	+5.4	75.6	81.7	64.3	93.7	74.6	65.2	74.6	76.9	26.3	127.1	75.6
Nov. 10	594,932	583,073	+2.0	1,675,760	1,616,875	+3.6	76.1	81.6	64.7	93.7	74.6	65.3	74.9	76.8	27.3	126.7	76.0
Nov. 17	584,525	602,708	—3.0	1,691,046	1,617,249	+4.6	76.3	81.7	66.5	93.8	75.0	65.5	75.7	77.0	28.0	126.6	76.6
Nov. 24	561,313	585,738	—4.2	.....	.....	....	75.8	81.6	66.4	43.8	75.0	65.5	75.8	77.1	28.1	....	....
Dec. 1	.....	.....	....	.....	.....	....	76.8	81.6	66.5	93.8	75.0	65.5	75.8	....	28.8	....	....

* 37 states, F. W. Dodge Corp.; ‡ 000 omitted; † Dept. of Labor, 3 year average, 1923-1925 = 100.0; *a* Includes all allied products but not petroleum refining; *b* Kw. 000 omitted.

Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizers and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1933 Average $1.56. - Jan. 1934 $1.37 - Nov. 1934 $1.27

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Acetaldehyde, drs c-l, wks lb.	...	.14	.14	.16½	...	...
Acetaldol, 95%, 50 gal drs wks .....lb.	.21	.25	.21	.31	.27	.31
Acetamide, tech, lcl, kegs..lb.	.38	.43	.40	1.35	.95	1.35
Acetanalid, tech, 150 lb bbls lb.	.24	.26	.24	.26	.26	.26
Acetic Anhydride, 100 lb cbys .....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech, drs .....lb.	.22	.24	.22	.32	.30	.32
Acetone, tks, delv .....lb.	.11	.12	.10	.12	.08	.10
drs, c-l, delv .....lb.	...	.12	.12	.12	...	...
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls .....lb.	.06¾	.07	.06	.07	.06	.12
Acetic, 28%, 400 lb bbls, c-l, wks .....100 lbs.	...	2.40	2.40	2.91	2.65	2.91
glacial, bbls, c-l, wks 100 lbs.	...	8.25	8.25	10.02	9.14	10.02
glacial, USP, bbls, c-l, wks .....100 lbs.	...	12.25	..	12.25	...	...
Adipic, kgs, bbls .....lb.	...	.72	.72	.72	.72	.72
Anthranilic, refd, bbls ....lb.	.85	.95	.85	.95	.85	.95
tech, bbls .....lb.	...	.75	.65	.75	.65	.70
Battery, cbys, delv ..100 lbs.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb kgs ..lb.	.40	.45	.40	.45	.35	.45
USP, 100 lb kgs .....lb.	.54	.59	...	...	...	...
Boric, tech, gran, 80 tons, bgs, delv .....ton *a*	...	80.00	80.00	80.00	80.00	80.00
ton *a*	...	90.00	90.00	90.00	90.00	90.00
ton *a*	...	85.00	85.00	85.00	85.00	85.00
ton *a*	...	95.00	95.00	95.00	95.00	95.00
Broenner's, bbls .....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 95%, cbys .....lb.	.53	.60	.53	.85	.85	.85
edible, c-l, wks, cbys ...lb.	1.20	1.30	1.20	1.30	...	...
synthetic, c-l, drs .....lb.	...	.22	.22	.22	...	...
wks .....lb.	...	.23	.23	.23	...	...
tks, wks .....lb.	...	.21	.21	.21	...	...
Camphoric, drs .....lb.	...	5.25	5.25	5.25	5.25	5.25
Chicago, bbls. .....lb.	...	2.10	2.10	2.10	...	...
Chlorosulfonic, 1500 lb drs, wks .....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99¾%, drs, delv lb.	.13½	.15½	.13½	.15½	.11½	.14¼
Citric, USP, crys, 230 lb bbls .....lb. *b*	.28	.29	.28	.30	.29	.30
anhyd, gran, drs .....lb. *b*	...	.31	.31	.31	...	...
Cleve's, 250 lb bbls ..... lb.	.52	.54	.52	.54	.52	.54
Cresylic, 99%, straw, HB, drs, wks, frt equal ..gal.	.46	.47	.46	.47	...	...
99%, straw, LB, drs, wks, frt equal .....gal.	.64	.65	.64	.65	...	...
resin grade, drs, wks, frt equal .....gal.	.54	.55	.54	.55	...	...
Crotonic, drs .....lb.	.90	1.00	.90	1.00	...	...
Formic, tech, 140 lb drs ..lb.	.11	.13	.11	.13	.10½	.13
Fuming, see Sulfuric (Oleum)						
Fuoric, tech, 90%, 100 lb. drs. .. ..lb.	...	.35	...	.35	...	.35
Gallic, tech, bbls .....lb.	.65	.68	.60	.70	.60	.70
USP, bbls .....lb.	.70	.80	.74	.80	...	...
Gamma, 225 lb bbls, wks...lb.	.77	.79	.77	.79	.75	.79
H, 225 lb. bbls, wks .....lb.	.50	.55	.50	.70	.60	.70
Hydriodic, USP, 10% sol. cbys .....lb.	.50	.51	.50	.51	.50	.51
Hydrobromic, 48% com 155 lb cbys, wks .....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, see muriatic.						
Hydrocyanic, cyl, wks ....lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks .....lb.	.07	.07½	.07	.07½	.06	.07
Hydrofluosilicic, 35%, 400 bbls, wks .....lb.	.11	.12	.11	.12	.11	.12
Lactic, 22%, dark, 500 lb bbls .....lb.	.04½	.05	.04	.05	.04	.04½
22%, light refd, bbls ..lb.	.06½	.07	.06½	.07	...	...
44%, light, 500 lb bbls ..lb.	.11½	.12	.11½	.12	.11½	.12
44%, dark, 500 lb bbls ..lb.	.09½	.10	.09	.10	...	...
USP X, 95%, cbys ....lb.	.50	.52	...	...	...	...
USP VIII, 75%, cbys ..lb.	.48	.52	...	...	...	...
Laurent's, 250 lb bbls ....lb.	.36	.37	.36	.37	.36	.37
Linoleic, bbls .....lb.	.16	.16	.16	.16	.16	.16
Maleic, powd, kgs .....lb.	.29	.32	.25	.32	...	...
Malic, powd, kgs .....lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls ....lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks .....N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.01	.008	.01
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls .....lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks .....100 lb.	...	1.35	...	1.35	...	1.35
tks, wks .....100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks ..100 lb.	...	1.45	...	1.45	...	1.45
tks, wks .....100 lb.	...	1.20	...	1.20	...	1.20
22°, c-l, cbys, wks ..100 lb.	...	1.95	...	1.95	...	1.95
tks, wks .....100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys .....lb.	.06½	.07⅛	.06½	.07⅛	.06½	.07⅛
N & W, 250 lb bbls .....lb.	.85	.87	.85	.87	.85	.95
Naphthenic, drs .....lb.	.12	.13	.10	.13	.10	.11½
Naphthionic, tech, 250 lb bbls .....lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys. c-l, wks .....100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks..100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks..100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks..100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv .....lb.	.11½	.12½	.11½	.12½	...	...
Oxalic, 300 lb bbls, wks, or N. Y. .....lb.	.11½	.12½	.11½	.12⅛	.11	.12⅜
Phosphoric, 50%, USP, cbys .....lb.	.14	.14	.14	.14	.14	.14
50%, acid, c-l, drs, wks..lb.	.06	.08	.05	.08	.05	.05
75%, acid, c-l, drs, wks..lb.	.09	.10½	.07	.10½	.07	.07
Picramic, 300 lb bbls, wks.lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks .....lb.	.30	.40	.30	.50	.30	.50
Pyrogallic, crys, kgs, wks..lb.	1.55	1.65	1.40	1.65	1.40	1.55
Salicylic, tech, 125 lb bbls, wks .....lb.	...	.40	.33	.40	.33	.37
Sebacic, tech, drs, wks ....lb.	...	.58	...	.58	...	.58
Sulfanilic, 250 lb bbls, wks lb.	.18	.19	.18	.19	.15	.17
Sulfuric, 60°, tks, wks ..ton	...	11.00	...	11.00	...	11.00
c-l, cbys, wks ....100 lb.	...	1.10	...	1.10	...	1.10
66°, tks, wks .....ton	...	15.50	15.00	15.50	15.00	15.50
c-l, cbys, wks ....100 lb.	...	1.35	...	1.35	...	1.35
CP, cbys, wks .....lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks .....ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran powd, 300 lb bbls .....lb.	...	.25	.25	.26	.20	.25
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75	.80
Trichloroacetic bottles.....lb.	2.45	2.75	2.00	2.75	2.00	2.75
kgs .....lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls .....lb.	1.50	1.60	1.35	1.70	1.40	1.70
Vanadic, drs, wks .....lb.	1.10	1.20	1.10	1.20	...	...
Albumen, light flake, 225 lb bbls .....lb.	.45	.53	.35	.53	.35	.43
dark, bbls .....lb.	.12	.17	.10	.17	.10	.17
egg, edible .....lb.	.85	.87	.82	.92	.74	.90
vegetable, edible .....lb.	.65	.70	.65	.70	.60	.70
ALCOHOLS						
Alcohol, Amyl, tks, delv...lb.	...	.143	...	.143	.143	.176
c-l, drs, delv .....lb.	...	.15	.15	.157	...	...
Amyl, secondary, tks, delv .....lb.	...	.108	...	.108	...	...
c-l, drs, delv .....lb.	...	.118	...	.118	...	...
Amyl, tertiary, taks, delv lb	...	.052	...	.052	...	...
c-l, drs, delv .....lb.	...	.062	...	.062	...	...
Benzyl, bottles .....lb.	.75	1.10	.75	1.10	...	...
Butyl, normal, tks, delv lb. *d*	...	.12	.09½	.12	.09½	.09½
c-l, drs, delv .....lb. *d*	...	.13	.10½	.13	.10½	.10½
Butyl, secondary, tks, delv .....lb. *d*	...	.096	.076	.096	...	...
c-l, drs, delv .....lb. *d*	...	.106	.086	1.06	...	...
Capryl, drs, tech, wks ..lb.	...	.85	.85	.85	.85	.85
Cinnamic, bottles .....lb.	3.25	3.65	3.25	3.65	...	...
Denatured, No. 5, c-l, drs, wks .....gal. *e*	...	.34	.30	.34	...	...
Western schedule, c-l, wks .....gal. *e*	...	.38	...	...	...	...
Denatured, No. 1, tks, wks .....gal. *e*	...	.29½	.29½	.304	...	...
c-l, drs, wks .....gal. *e*	...	.34½	...	...	...	...
Western schedule, tks, wks .....gal. *e*	...	.32½	...	...	...	...
c-l, drs, wks .....gal. *e*	...	.37½	...	...	...	...
Diacetone, tech, tks, delv .....lb. *f*	...	.16	...	...	...	...
c-l, drs, delv .....lb. *f*	...	.17	...	.17	...	...

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Alcohols (continued)					
Ethyl, 190 proof, molasses, tks ..... gal. *g*	...	4.08½	...	4.08½	...	...
c-l, drs ..... gal. *g*	...	4.13½	...	4.13½	...	...
c-l, bbls ..... gal. *g*	...	4.15½	4.12½	4.24½	2.44½	2.65
gal. *g*	4.15½	4.25½	...	...	...	...
gal. *g*	4.27½	4.29½	...	...	...	...
absolute, drs ..... gal. *g*	4.55½	6.10	...	...	...	...
Furfuryl, tech, 500 lb, drs ..... lb.	...	.35	.35	.40	.40	.45
Hexyl, tks, delv ..... lb.	...	.11½	...	.11½	...	...
c-l, drs, delv ..... lb.	...	.12½	...	.12½	...	...
Isoamyl, prim, cans, wks lb.	4.00	4.50	4.00	4.50	...	...
Isobutyl, refd, lcl, drs .. lb.	...	.60	.60	.75	...	...
Isopropyl, refd, c-l, drs .. lb.	...	.55	.45	.55	...	...
Propyl, norm, 50 gal drs gal.	...	.75	...	.75	...	.75
Aldehyde ammonia, 100 gal drs ..... lb.	.80	.82	.80	.82	.80	.82
Alphanaphthol, crude, 300 lb bbls ..... lb.	.60	.65	.65	.70	.65	.70
Alphanaphthylamine, 350 lb bbls ..... lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ..... 100 lb.	...	3.00	2.90	3.00	...	...
25 bbls or more, wks ..... 100 lb.	...	3.15	...	3.15	...	...
less than 25 bbls, wks ..... 100 lb.	..	3.25	...	3.25	...	...
Granular, c-l, bbls, wks 100 lb.	...	2.75	...	2.75	...	...
25 bbls or more, wks ..... 100 lb.	...	2.90	...	2.90	...	...
Powd, c-l, bbls, wks 100 lb.	...	3.15	...	3.15	...	...
25 bbls, or more, wks ..... 100 lb.	...	3.30	...	3.30	...	...
Chrome, bbls ..... 100 lb.	7.00	7.25	6.50	7.25	4.50	6.50
Potash, lump, c-l, bbls, wks ..... 100 lb.	...	3.25	...	3.25	...	...
25 bbls or more, wks ..... 100 lb.	...	3.40	...	3.40	...	...
Granular, c-l, bbls, wks 100 lb.	...	3.00	...	3.00	...	...
25 bbls or more, bbls, wks ..... 100 lb.	...	3.15	...	3.15	...	...
Powd, c-l, bbls, wks 100 lb.	...	3.40	...	3.40	...	...
25 bbls or more, wks ..... 100 lb.	...	3.55	...	3.55	...	...
Soda, bbls, wks ..... 100 lb.	4.00	4.15	3.50	4.15	3.50	3.75
Aluminum metal, c-l NY ..... 100 lb.	20.00	23.30	20.00	24.30	22.00	24.30
Acetate, CP, 20%, bbls lb.	.09	.10	.09	.10	...	...
Chloride anhyd, 99%, wks ..... lb.	.07	.12	.07	.12	...	...
93%, wks ..... lb.	.05	.08	.04	.08	...	...
Crystals, c-l, drs, wks ... lb.	.06½	.07	.06½	.01	...	...
Solution, drs, wks ..... lb.	.03	.03½	.03	.03½	...	...
Hydrate, 96%, light, 90 lb. bbls, delv ..... lb.	.13	.15	.13	.16½	.15	.16½
heavy, bbls, wks ..... lb.	.04	.04½	.04	.04½	...	...
Oleate, drs ..... lb.	...	.15¾	...	.15¾	...	...
Palmitate, bbls ..... lb.	.20	.21	.19	.21	...	...
Resinate, pp., bbls ..... lb.	...	.15	.12½	.15	...	...
Stearate, 100 lb bbls.... lb.	.17	.19	.17	.18	.12½	.18
Sulfate, com, c-l, bgs, wks ..... 100 lb.	...	1.35	1.35	1.35	1.25	1.50
c-l, bbls, wks ..... 100 lb.	...	1.55	1.55	1.55	...	...
Sulfate, iron-free, c-l, bgs, wks ..... 100 lb.	...	1.90	1.90	1.90	1.90	1.95
c-l, bbls, wks ..... 100 lb.	...	2.05	2.05	2.05	...	...
Aminoazobenzene, 110 lb kgs ..... lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd com, tks.. lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.15¼	.21½	.15¼	.21½	.15¼	.15½
26°, 800 lb drs, delv .... lb.	.02½	.03	.02½	.03	.02½	.03
Aqua 26° tks NH .... cont.	...	.05	...	.05	...	.05
tk wagon ..... lb.	...	.024	...	...	...	...
Ammonium Acetate, kgs .. lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. plant ..... 100 lb.	5.15	5.71	5.15	5.71	...	5.15
Bifluoride, 300 lb bbls... lb.	.15	.17	.15	.17	.15¼	.17
carbonate, tech, 500 lb bbls ..... lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks ..... 100 lb	4.45	4.90	4.45	5.25	4.45	5.25
Gray, 250 lb bbls wks ... lb.	5.00	5.75	5.00	5.75	5.25	5.75
Lump, 500 lbs cks spot lb.	.10½	.11	.10	.11	.10	.11
Lactate, 500 lb bbls .... lb.	.15	.16	.15	.16	.15	.16
Linoleate ..... lb.	.11	.12	.11	.12	...	.11
Nitrate, tech, cks ..... lb.	.04	.05	.03¾	.05	.03¾	.10
Oleate, drs ..... lb.	...	.10	...	.10	...	.10
Oxalate, neut, cryst, powd, bbls ..... lb.	.26	.27	.26	.27	...	...
pure, cryst, bbls, kgs. lb.	.27	.28	.27	.28	...	...
Serchlorate, kgs ..... lb.	...	.16	.16	.16	...	...
Persulfate, 112 lb kgs .. lb.	.22½	.25	.20	.25	.20	.22½
Phosphate, dibasic tech, powd, 325 lb bbls .... lb.	.08	.10	.08	.11½	.08½	.11½
Sulfate, dom, f.o.b., bulk ton	...	24.00	22.00	25.00	20.00	25.00
200 lb bgs ..... ton	...	25.80	...	25.80	...	...
100 lb bgs ..... lb.	...	26.50	...	26.50	...	...
Sulfocyanide, kgs ..... lb.	...	.50	...	.50	.36	.50
Amyl Acetate (from pentane) tks delv ..... lb.	...	.13½	...	.13½	...	.13½
tech, drs, delv ..... lb.	.142	.149	.142	.149	.138	.149
secondary, tks, delv .. lb.	...	.108	.09	.108	...	.09
c-l, drs, delv ..... lb.	.118	.123	...	.123	...	...
Alcohol, see Alcohol, Amyl, also Fusel Oil.						

g Grain alcohol 20c a gal. higher in each case.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Amyl Chloride, norm drs, wks lb.	.56	.68	.56	.68	...	...
Chloride, mixed, drs, wks ..... lb.	.07	.077	.07	12.2	...	...
tks, wks ..... lb.	...	.06	.06	10.5	...	...
Lactate, drs, wks ..... lb.	...	.50	...	.50	...	...
Mercaptan, drs, wks .... lb.	...	1.10	...	1.10	...	...
Stearate, drs, wks ..... lb.	...	.31	...	.31	...	..
Amylene, drs, wks ..... lb.	.102	.11	.10	.11	...	...
tks, wks ..... lb.	...	.09	...	.09	...	...
Aniline Oil, 960 lb drs and tks lb.	.15	.17½	.15	.17½	.14½	.16
Annatto fine ..... lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% ..... lb.	...	.75	...	.75	...	...
40% ..... lb.	...	.18	...	.18	...	...
Anthraqumone, sublimed, 125 lb bbls ..... lb.	.45	.50	.45	.50	...	.45
Antimony, metal slabs, ton lots ..... lb.	...	.10	.07	.10	.05⅝	.07½
Needle, powd, bbls ..... lb.	.07¾	.08¼	.07	.09	.07	.09
Butter of, see Chloride.						
Chloride, soln cbys ..... lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls ..... lb.	.09¼	.10	.08	.11	.07½	.11
Salt, 63% to 65%, tins .. lb.	.22	.24	.22	.24	.20	.24
Sulfuret, golden, bbls .. lb.	.19	.23	.16	.23	.16	.20
Vermilion, bbls ..... lb.	.35	.42	.35	.42	.38	.42
Archil, conc, 600 lb bbls .. lb.	.21	.27	.21	.27	.20	.21
Double, 600 lb bbls ..... lb.	.18	.20	.18	.20	.16	.17
Triple, 600 lb bbls ..... lb.	.18	.20	.18	.20	.16	.17
Arglos, 80%, casks ..... lb.	.15	.16	.15	.16	.12	.15
Crude, 30%, casks ..... lb.	.07	.08	.07	.09	.06¾	.09
Aroclors, wks ..... lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl ..... lb.	.08¾	.09¾	.08¾	.09¼	...	...
Arsenic, Red, 224 lb cs kgs lb.	...	.15¾	.14	.15¾	.09⅜	.14¼
White, 112 lb kgs ..... lb.	.03½	.04½	.03½	.05	.04	.05
Metal ..... lb.	.40	.42	.40	.45	...	...
Asbestine, c-l wks ..... ton	13.00	15.00	13.00	15.00	13.00	15.00
Barium Carbonate precip, 200 lb bgs, wks ..... ton	56.50	61.00	56.50	61.00	56.50	61.00
Nat (witherite) 90% gr, c-l, wks, bgs ..... ton	42.00	45.00	42.00	45.00	...	...
Chlorate, 112 lb kgs NY lb.	.14	.16	.14	.16	.13¾	.16
Chloride, 600 lb bbl wks ton	72.00	74.00	72.00	74.00	61.50	74.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.13	.11	.13
Hydrate, 500 lb bbls .... lb.	.05½	.06	.04¾	.06	.04¼	.05
Nitrate, 700 lb cks ..... lb.	...	.08¼	...	.08¼	...	.07¼
Barytes, floated, 350 lb bbls wks ..... ton	23.00	30.50	23.00	30.50	22.20	30.50
Bauxite, bulk, mines ..... ton	7.00	10.00	5.00	10.00	5.00	6.00
Benzaldehyde, tech, 945 lb drs, wks ..... lb.	.60	.62	.60	.65	.60	.65
Benzene (Benzol), 90%, Ind, 8000 gal tks, frt allowed ..... gal.	...	.19	.19	.20½	.20	.22
90% c-l, drs ..... gal.	...	.24	...	.24	...	...
Ind Pure, tks, frt allowed ..... gal.	...	.19	.19	.20½	.20	.22
Benzidine Base, dry, 250 lb bbls ..... lb.	.67	.69	.67	.69	.65	.67
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, tech, drs.. lb.	.30	.40	.30	.40	...	.30
Beta-Naphthol, 250 lb bbl, wks ..... lb.	...	.24	...	.24	...	.24
Naphthylamine, sublimed, 200 lb bbls ..... lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ..... lb.	.53	.55	.53	.58	.53	.58
Bismuth metal	1.10	1.20	1.10	1.30	.85	1.30
Chloride, boxes ..... lb.	3.20	3.25	...	...	...	...
Hydroxide, boxes ..... lb.	3.15	3.20	...	...	...	...
Oxychloride, boxes .... lb.	2.95	3.00	...	...	...	...
Subbenzoate, boxes ..... lb.	3.25	3.30	...	...	...	...
Subcarbonate, kgs ..... lb.	1.65	1.70	...	...	...	...
Trioxide, powd, boxes .. lb.	3.45	3.50	...	...	...	...
Subnitrate	1.40	1.45	1.40	1.60	.95	1.40
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ..... ton *h*	42.50	70.00	42.50	70.00	42.50	75.00
Bleaching Powder, 800 lb drs c-l wks contract.. 100 lb.	...	1.90	...	1.90	1.75	1.90
lcl, drs, wks ..... lb.	2.15	3.50	2.00	3.50	...	...
Blood, dried, f.o.b., NY..unit	2.60	2.75	2.40	3.25	1.55	2.75
Chicago, high grade ...unit	...	2.75	2.00	3.10	...	...
Imported shipt .....unit	...	2.85	2.75	3.20	1.90	3.00
Blues, Bronze Chinese Milori Prussian Soluble ..... lb.	.35½	.37½	.35½	.37½	...	.35
Bone, 4½ + 50% raw, Chicago ..... ton	19.00	20.00	19.00	25.00	19.00	28.00
Bone Ash, 100 lb kgs ..... lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls ..... lb.	.05½	.08¼	.05½	.08¼	.05½	.08
Meal, 3% & 50%, imp. .ton	23.50	24.00	16.00	24.00	18.00	27.50
Domestic, bgs, Chicago..ton	16.00	17.00	...	...	...	...
Borax, tech, gran, 80 ton lots, sacks, delv ..... ton *i*	...	36.00	36.00	36.00	36.00	36.00
bbls, delv ..... ton *i*	...	46.00	46.00	46.00	46.00	46.00
c-l, sacks, delv ..... ton *i*	...	40.00	40.00	40.00	40.00	40.00
c-l, bbls, delv ..... ton *i*	...	50.00	50.00	50.00	50.00	50.00
Tech, powd, 80 ton lots, sacks ..... ton *i*	...	41.00	41.00	41.00	41.00	41.00
bbls, delv ..... ton *i*	...	51.00	51.00	51.00	51.00	51.00
c-l, sacks, delv ..... ton *i*	...	45.00	45.00	45.00	45.00	45.00
c-l, bbls, delv ..... ton *i*	...	55.00	55.00	55.00	55.00	55.00
Bordeaux Mixture, jobbers, East, c-l, tins, drs, cases lb.	.08	.16	...	.16	...	...
Jobbers, West, c-l ..... lb.	.08	.10	...	.10	...	...
Dealers, East, c-l ..... lb.	.08½	.16½	...	.16½	...	...
Dealers, West, c-l ..... lb.	.09	.11	...	.11	...	...

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case.

ODORLESS ACETAMIDE

C. P. Grade

Odor	**None**
Melting point	**79-81° C.**
Boiling range	**215-221° C.**

TECHNICAL ACETAMIDE

Odor	**Slight, characteristic**
Melting point	**77-79° C.**
Boiling range	**210-220° C.**

ACETAMIDE is an exceptional SOLVENT for most organic and inorganic compounds

ACETAMIDE deserves your consideration in

- Soldering pastes and fluxes
- Solubilizing dyestuffs
- Lacquers and explosives as an anti-acid
- Plasticizing cellulose acetate
- Textile dyeing as a penetration accelerator
- Synthesis of sedative preparations
- Cosmetics to enhance smoothness
- Organic synthesis as a raw material
- Printer's roller compositions
- Glue and starch adhesives as a solvent
- Leather dressings as a hygroscopic agent
- Safety glass as a bonding agent
- Textile bleaches as an activator

NIACET PRODUCTS

Glacial & U. S. P. Acetic Acid
Acetaldehyde
Acetaldol
Acetal
Acetamide
Aluminum Acetate and Formate
Crotonaldehyde
Crotonic Acid
Ethyl Crotonate
Iron Acetate
Methyl Acetate
Paraldehyde
Triacetin

Samples of both grades and further information for your particular problems will be mailed on request

NIACET

CHEMICALS CORPORATION

Sales Office and Plant ❖ Niagara Falls, N. Y.

Bromine
Chromium Fluoride

Prices

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Bromine, cases .....lb.	.30	.43	.30	.43	.36	.43
Bronze, Al, pwd, 300 lb drs lb.	.80	1.50	.80	1.50	...	...
Gold, blk .....lb.	.40	.55	.40	.55	.40	.55
Butanes, com 16-32° group 3 tks .....lb.	...	.04	.02¾	.04	.02¾	.04
Butyl, Acetate, norm drs, frt allowed .....lb.	.13	.13½	.11	.14	.11	.139
tks, frt allowed .....lb.	.12	.13	.10	.13	.10	.124
Secondary tks, frt allowed lb.	...	.096	.08	.096	...	...
drs, frt, allowed .....lb.	.106	.111	...	.111	...	...
Aldehyde, 50 gal drs wks lbs.	.19	.21	.19	.36	.31½	.36
Secondary, drs .....lb.	.60	.75	.60	.75	...	...
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	...	...
Furoate, tech, 50 gal drs lb.	...	.65	.60	.65	.50	.60
Lactate drs .....lb.	.22½	.23½	.22½	.29	...	...
Propionate, drs .....lb.	.18	.18½	.17	.22	.20	.22
tks, delv .....lb.	...	.17	...	.17	...	...
Stearate, 50 gal drs ....lb.	...	.26	.25	.26	.25	.25
Tartrate, drs .....lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes...lb.	.75	.85	.65	.85	.65	.75
Calcium, Acetate, 150 lb bgs c-l, delv .....100 lb.	...	2.00	2.00	3.00	2.50	3.00
Arsenate, jobbers, East of Rocky Mts, drs .....lb.	.06	.06½	...	...	...	...
dealers, drs .....lb.	.06¼	.07½	...	...	...	...
South, jobbers, drs .....lb.	.06	.06½	...	...	...	...
dealers, drs .....lb.	.06¼	.06½	...	...	...	...
Carbide, drs .....lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l .....lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, flake, 375 lb drs c-l wks ... .ton	...	19.50	...	19.50	19.50	21.00
Solid, 650 lb drs c-l f.o.b. wks .....ton	...	17.50	...	17.50	17.50	18.00
Ferrocyanide, 350 lb bbls wks .....lb.	...	.17	...	.17	.17	.17
Furoate, tech, 100 lb drs lb.	...	.25	.25	.30	...	.30
Gluconate, tech, 125 lb bbls ..... lb.	...	.28	.25	.28	...	...
Nitrate, 100 lb bgs .....ton	...	26.50	...	26.50	24.00	26.50
Palmitate, bbls .....lb.	.20	.21	.19	.20	.16	.19
Peroxide, 100 lb drs ....lb.	...	1.25	...	1.25	...	1.25
Phosphate, tech, 450 lb bbls .....lb.	.07½	.08	.07½	.08	.07½	.08
Resinate, precip, bbls ...lb.	.13	.14	.13	.14	...	...
Stearate, 100 lb bbls....lb.	.17	.19	.17	.19	.12½	.18
Camphor, slabs .....lb.	.50	.52	.51	.59	.35½	.59
Powder .....lb.	.50	.52	.51	.59	.38	.59
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon, Decolorizing, drs c-l .....lb.	.08	.15	.08	.15	.08	.15
Black, c-l, bgs, delv, price varying with zone ....lb.	.0445	.0535	.0445	.0535	...	...
lcl, bgs, delv, all zones lb.	...	.07	.06½	.07	...	...
cartons, delv .....lb.	...	.07¾	...	.07¾	...	...
cases, delv .....lb.	...	.08¼	...	.08¼	...	...
Bisulfide, 500 lb drs....lb.	.05¼	.08	.05½	.08	.05½	.06
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	...	.06
Tetrachloride, 1400 lb drs, delv .....lb.	.05¼	.06	.05¼	.06	.05¼	.07
Casein, Standard, Dom grd lb.	.09¼	.12½	.09¼	.13	.06½	.15
80-100 mesh, c-l, bgs ....lb.	.10	.13	.10	.14	...	...
Castor Pomace, 5½ NH_3, cl, bgs, wks .....ton	...	18.50	...	...	...	...
Imported, ship, bgs ....ton	19.50	20.00	...	...	...	...
Celluloid, Scraps, ivory cs lb.	.17	.18	.13	.18	.13	.15
Transparent, cs .....lb.	...	.20	.16	.20	...	.16
Cellulose, Acetate, 50 lb kgs .....lb.	.55	.60	.55	.90	.80	.90
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.02	.03½
Light, 250 lb cks .....lb.	.03	.04	.03	.04	.02½	.03½
Charcoal, Hardwood, lump, blk, wks .....bu.	...	.15	.12	.18	.18	.19
Willow, powd, 100 lb bbl wks .....lb.	.06	.06¼	.06	.06¼	.06	.06¼
bgs, delv .....ton	25.00	30.00	...	...	...	...
Chestnut, clarified bbls wks lb.	...	.01⅞	.01⅝	.01⅞	.01¼	.02
25% tks wks .....lb.	...	.01½	.01¼	.01½	.012	.01½
Pwd, 60%, 100 lb bgs, wks .....lb.	...	.04⅞	...	.04⅞	...	.04¾
China Clay, c-l, blk mines ton	...	7.00	7.00	9.00	8.00	9.00
Powdered, bbls ..... lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks ...ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, blk ...ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls, lcl, wks contract .....lb.	.07½	.08½	.07	.08½	.07	.08½
cyls, c-l, contract .. lb. *j*	...	.05½	...	.05½	...	.05½
Liq tk wks contract..100 lb.	...	2.00	1.85	2.00	1.75	1.85
Multi c-l cyls wks cont..lb.	2.15	2.40	2.00	2.40	...	...
Chloroacetophenone, tins, wks .....lb.	...	2.00	...	...	...	...
Chlorobenzene, Mono, 100 lb drs, lc-l, wks .....lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs .....lb.	.20	.21	.20	.21	.15	.20
USP, 25 lb tins .....lb.	.30	.31	.30	.35	...	...
Chloropicrin; comml cyls..lb.	.85	.90	.85	1.25	.90	1.35
Chrome, Green, CP .....lb.	.20	.30	.20	.30	.28	.29
Commercial .....lb.	.06¼	.10	.06¼	.10	.06¼	.10
Yellow .....lb.	.15	.16	.15	.16	.14	.16
Chromium, Acetate, 8% Chrome bbls .....lb.	.05	.05¾	.05	.05¾	.04¾	.05¾
20° soln, 400 lb bbls .. lb.	...	.05½	...	.05½	...	.05½
Fluoride, powd, 400 lb bbl .....lb.	.27	.28	.27	.28	.27	.28

j A delivered price.

Current

Coal Tar Diphenylguanidine

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Coal tar, bbls .....bbl.	7.25	9.00	7.25	9.00	8.50	9.00
Cobalt Acetate, bbls .....lb.	...	.60	.60	.80	...	...
Carbonate tech, bbls ....lb.	1.35	1.40	1.34	1.40	...	...
Hydrate, bbls .....lb.	1.66	1.76	1.66	1.76	...	...
Linoleate, paste, bbls ...lb.	...	.30	.30	.40	...	...
Resinate, fused, bbls ...lb.	...	.12½	...	.12½	...	...
Precipitated, bbls .....lb.	...	.32	.32	.42	.41	.42
Cobalt Oxide, black, bgs ..lb.	1.25	1.35	1.25	1.35	1.15	1.35
Cochineal, gray or bk bgs lb.	.34	.39	.33	.42	.36	.42
Teneriffe silver, bgs ...lb.	.35	.40	.34	.43	.37	.43
Copper, metal, electrol 100 lb.	...	9.00	7.87½	9.00	5.00	9.00
Carbonate, 400 lb bbls ..lb.	...	.08¼	...	.08¼	.07	.08
52-54% bbls .....lb.	.14½	.16¼	.15½	.16	.15¾	.17¼
Chloride, 250 lb bbls ..lb.	.17	.18	.17	.18	.17	.18
Cyanide, 100 lb drs ....lb.	.37	.38	.37	.40	.39	.40
Oleate, precip, bbls .....lb.	...	.20	...	.20	...	...
Oxide, red, 100 lb bbls ..lb.	.13	.17	.12½	.17	.14¾	.15
black bbls, wks .....lb.	.16	.16½	...	...	...	...
Resinate, precip, bbls ...lb.	.18	.19	.18	.19	...	...
Stearate, precip, bbls ..lb.	.35	.40	.35	.40	...	...
Sub-acetate verdigris, 400 lb bbls .....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-l wks 100 lb.	...	3.85	3.75	3.85	3.00	3.75
Copperas, crys and sugar bulk c-l, wks, bgs .....ton	12.00	13.00	12.00	14.50	14.00	14.50
Corn Syrup, 42 deg, bbls .....100 lb.	...	3.49	3.04	3.59	2.61	3.04
43 deg, bbls .....100 lb.	...	3.54	3.09	3.64	2.66	3.09
Cotton, Soluble, wet, 100 lb bbls ..... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, USP, powd & gran, 300 lb bbls .....lb.	...	.17¼	.17½	.19½	.14½	.17¾
Creosote, USP, 42 lb cbys lb.	.10	.12	.10	.12	.10	.12
Oil, Grade 1, tks .....gal.	.45	.47	.45	.47	.40	.47
Grade 2 .....gal.	.11	.12	.11	.12	.11	.12
Grade 3 .....gal.	.09	.12	.09	.12	.09	.12
Cresol, USP, drs .....lb.	.11	.11½	.11	.11½	.10½	.11
Crotonaldehyde, 98% 50 gal drs .....lb.	.32	.36	.26	.36	.32	.36
Cudbear, English .....lb.	.19	.25	.19	.25	.16	.25
Philippine, 100 lb bale ..lb.	.03½	.04¾	.03½	.04¾	...	...
Cyanamid, bags c-l frt allowed Ammonia unit	...	1.07½	...	1.07½	.97½	1.07½
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	4.05	3.50	4.20	2.89	3.84
British Gum, bgs ...100 lb.	...	4.20	3.75	4.60	3.89	3.92
White, 140 lb bgs ..100 lb.	4.00	4.10	3.47	4.20	2.94	3.79
Potato, Yellow, 220 lb bgs .....lb.	.07¾	.08¼	.07¾	.08¾	.07¾	.09
White, 220 lb bgs, lcl ...lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl ....lb.	...	.08¾	.06¾	.08¾	.06¾	.08
Diamylamine, drs, wks ....lb.	...	1.00	...	1.00	...	...
Diamylene, drs, wks .....lb.	.095	.102	.09	.102	...	...
tks, wks .....lb.	...	.08½	...	.08½	...	...
Diamylether, wks, drs ....lb.	.085	.092	.09	.77	...	...
tks, wks .....lb.	...	.075	...	...	...	...
Diamylphthalate, drs wks gal.	...	.20½	...	.20½	...	...
Diamyl Sulfide, drs, wks lb.	...	1.10	...	1.10	...	...
Dianisidine, bbls .....lb.	2.25	2.45	2.35	2.45	2.35	2.70
Dibutylphthalate, drs, wks lb.	.22	.23	.20½	.21	.20½	.22
Dibutyltartrate, 50 gal drs lb.	.29½	.31½	.29½	.31½	.29½	.21
Dichlorethylene, drs .....gal.	.29	...	.29	...	...	...
Dichloroethylether, 50 gal drs, wks .....lb.	.16	.17	.16	.21	.16	.21
tks, wks .....lb.	...	.15	...	.15	...	...
Dichloromethane, drs, wks lb.	...	.15	...	.15	...	...
tks, wks .....lb.	...	.02½	...	.02½	...	...
Dichloropentanes, drs, wks lb.	.032	.040	.0278	.040	...	...
tks, wks .....lb.	...	.02½	...	.02½	...	...
Diethylamine, 400 lb drs ..lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethyl Carbinol, drs .....lb.	.60	.75	.60	.75	...	...
Diethylcarbonate, com drs lb.	.31⅜	.35	.31⅜	.35	...	...
90% grade, drs .....lb.	...	.25	...	.25	...	...
Diethylaniline, 850 lb drs..lb.	.52	.55	.52	.55	.52	.55
Diethylorthotoluidin, drs ..lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb drs .....lb.	.26	.27	.26	.27	.20	.26
Diethylsulfate, tech, 50 gal drs .. ..lb.	...	...	...	...	...	...
Diethyleneglycol, drs .....lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ethers, drs..lb.	.15	.17	.15	.17	.15	.16
tks, wks .....lb.	...	.15	...	...	...	...
Mono butyl ether, drs ..lb.	...	.26	...	.26	...	.26
Diethylene oxide, 50 gal drs .....lb.	.26	.27	.26	.27	.26	.27
Diglycol Oleate, bbls .....lb.	.16	.18	.16	.18	...	...
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ..... lb.	...	.95	.95	1.20	...	...
Dimethylaniline, 340 lb drs lb.	.29	.30	.29	.30	.25	.28
Dimethyl Ethyl Carbinol, drs .....lb.	.60	.75	.60	.75	...	...
Dimethyl phthalate, drs ...lb.	.21½	.24½	.24	.24½	...	...
Dimethysulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls .....lb. *k*	.17	.19½	.17	.19½	...	.18
Dintrochlorobenzene, 400 lb bbls .....lb.	.14	.15½	.14	.15½	.13	.15
Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls lb.	.15½	.16½	.15½	.16½	.15	.17
Diphenyl .....lb.	.15	.25	.15	.25	.15	.40
Diphenylamine .....lb.	.31	.32	.31	.34	.31	.34
Diphenylguanidine, 100 lb bbl .....lb.	.36	.37	.36	.37	.30	.37

k Higher price is for purified material.

Barrett Standard

BENZOL

TOLUOL

XYLOL

SOLVENT NAPHTHA

All Barrett Standard Light Oil Distillates are made to rigid specifications under a system of strict laboratory control which has been perfected during Barrett's eighty years of successful manufacturing experience. Service and deliveries are *Barrett Standard* also. Shipments are made in tank-cars or drums, or by express tank-trucks direct to your plant if it is located within fifty or sixty miles of our distributing points in thirteen industrial centers. Phone, wire or write for information.

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PHENOL (Natural), U.S.P. 39.5°C.M. Pt. 40°C.M.Pt., Technical 39°C.M.Pt. Crude 82-84% and 90-92%... CRESOL: U.S.P., Meta Para, Ortho, Special Fractions... CRESYLIC ACID: 99%, Straw Color and 95%, Dark ... XYLENOLS ... TAR ACID OILS ... NAPHTHALENE: Crude, Refined Chipped, Flake and Ball ... RUBBER SOFTENERS ... CUMAR*: Paracoumarone-indene Resin... BARRETAN ... PICKLING INHIBITORS ... PYRIDINE: Refined, Denatured and Commercial ... PICOLINES ... QUINOLINES ... FLOTATION OILS and REAGENTS ... HYDROCARBON OIL ... SHINGLE STAIN OIL ... SPECIAL HEAVY OIL ... HI-FLSAH NAPHTHA. *Reg. U. S. Pat. Office

THE BARRETT COMPANY

40 Rector Street — New York, N. Y.

The following

ORGANIC CHEMICALS

ARE AVAILABLE FOR SPOT OR CONTRACT SALE

1:2:4 ACID
ACETYL ORTHO-TOLUIDINE
ALPHA-NAPHTHOL
ALPHA-NAPHTHYLAMINE
ALPHA-NITRONAPHTHALENE
AMINOAZOBENZENE-SODIUM-SULFONATE
AMINOAZOTOLUENE
AMINO G SALT
AMINO J SALT
ANILINE
ANTIOXIDANTS
BENZIDINE (BASE)
BENZOIC ACID, TECHNICAL
BETA-HYDROXYNAPHTHOIC ACID
BETA-NAPHTHYLAMINE
BROENNER'S ACID
CATECHOL
CHICAGO ACID
CLEVE'S ACIDS
CRESIDINE
DENATURED ALCOHOLS
DIANISIDINE (BASE)
DIBENZYL-PARA-AMINOPHENOL
DIBUTYLAMINE
DIETHYLANILINE
DIETHYL-META-AMINOPHENOL
DIMETHYLAMINE
DIMETHYLANILINE
DINITROBENZENE
DINITROCHLOROBENZENE
DINITROPHENOL
DINITROSTILBENEDISULFONIC ACID
DINITROTOLUENE
DINITROTOLUENE OIL
DI-ORTHO-TOLYLTHIOUREA
DIPHENYLAMINE
EPSILON ACID
ETHER
ETHYLACETANILIDE
ETHYL ALCOHOL
ETHYLBENZYLANILINE
FLOTATION REAGENTS
GAMMA ACID
G SALT
INHIBITORS
J ACID
KOCH ACID
L ACID
LAURENT'S ACID
METANILIC ACID
META-NITROANILINE
META-NITRO-PARA-TOLUIDINE
META-NITROTOLUENE
META-PHENYLENEDIAMINE
META-TOLUIDINE
META-TOLYLENEDIAMINE
META-XYLIDINE

DU PONT
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
Organic Chemicals Department
Wilmington, Delaware

Dip Oil
Glycerin

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Dip Oil, see Tar Acid Oil.					
Divi Divi pods, bgs shipmt. ton	36.00	40.00	35.00	40.00	26.00	36.00
Extract .....lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb. cases ...lb.	.44	.54	.40	.54	.40	.43
Epsom Salt, tech, 300 lb bbls c-l NY .....100 lb.	2.20	2.25	2.20	2.25	...	2.20
USP, c-l, bbls .....100 lb.	...	2.25	2.25	2.25	...	...
Ether, USP anaesthesia 55 lb drs .....lb.	.22	.23	.22	.24	.22	.24
(Conc) .....lb.	.09	.10	.09	.10	.09	.10
Ether, Isopropyl 50 gal drs lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed .....lb.	...	.06	...	...	...	...
Nitrous, conc, bottles ...lb.	.75	.77	.75	.77	...	...
Synthetic, wks, drs ....lb.	.08	.09	.08	.09	...	...
Ethyl Acetate, 85% Ester tks .....lb.	.07½	.08	.07½	.08	.07½	.09
drs .....lb.	.08½	.09	.08½	.09	.08½	.10
Anhydrous, tks .....lb.	...	.08½	.08½	.10	.09	.10
drs .....lb.	.09½	.10	.09½	.10¼	.10	.10¼
Acetoacetate, 50 gal drs lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drs .....lb.	.50	.55	.50	.55	.50	.55
Chloride, 200 lb drs ....lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate cbys ..lb.	...	.30	...	.30	...	.30
Crotonate, drs .....lb.	1.00	1.25	1.00	1.25	...	...
Ether, Absolute, 50 gal drs .....lb.	.50	.52	.50	.52	.50	.52
Lactate, drs, wks .....lb.	.25	.29	.25	.33	.25	.29
Methyl Ketone, 50 gal drs, frt allowed .....lb.	.08½	.09	.08½	.09	...	.12½
tks, frt allowed .....lb.	...	.07½	...	...	...	...
Oxalate, drs, wks ..... lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks .....lb.	.30	.30½	.30	.30½	.30	.30½
Ethylene Dibromide, 60 lb drs .....lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .....lb.	.75	.85	.75	.85	.75	.85
Dichloride, 50 gal drs ..lb.	.0545	.0994	.0545	.09	.05	.09
Glycol, 50 gal drs, wks lb.	.26	.28	.26	.28	.25	.28
Mono Butyl Ether, drs, wks	.20	.21	.20	.21	...	.20
tks, wks .....lb.	...	.19	.19	.19	...	...
Mono Ethyl Ether, drs, wks	.16	.17	.15	.17	.15	.17
tks, wks .....lb	...	.15	.15	.15	...	...
Mono Ethyl Ether Acetate, drs, wks	.17½	.18½	.16½	.18½	.16½	.18
tks, wks .....lb.	...	.16½	.16½	.16½	...	...
Mono, Methyl Ether, drs .....lb	.21	.23	.21	.23	.21	.23
Stearate	.18	.18	.18	.18	.18	.18
Oxide, cyl ..... lb.	...	.75	...	.75	...	.75
Ethylidenaniline .....lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery .....ton	...	14.50	...	14.50	14.00	16.50
Powd, blk, wks .....ton	14.00	14.50	13.50	14.50	13.50	14.50
Ferric Chloride, tech, crys, 475 lb bbls .....lb.	.05	.07½	.05	.07½	.04½	.07½
sol, cbys .....lb.	.06¼	.06½	...	...	...	...
Fish Scrap, dried, unground, wks .....unit *l*	...	2.50	2.25	2.60	1.85	2.75
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .....unit *m*	...	2.00	2.00	2.50	1.85	2.50
Fluorspar, 98%, bgs	28.00	35.50	28.00	35.50	28.00	35.50
Formaldehyde, USP, 400 lb bbls, wks .....lb.	.06	.07	.06	.07	.06	.07
Fossil Flour .....lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines .....ton	6.50	15.00	6.50	15.00	15.00	20.00
Imp powd, c-l, bgs .....ton	23.00	30.00	23.00	30.00	24.00	30.00
Furfural (tech) drs, wks lb.	.10	.25	.10	.25	.10	.15
Furfuramide (tech) 100 lb drs .....lb.	...	.30	...	.30	...	.30
Furfuryl Acetate, 1 lb tins lb.	...	5.00	...	5.00	...	5.00
Fusel Oil, 10% impurities lb.	.16	.18	.16	.18	.14½	.18
Fustic, chips .....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes ..lb.	.20	.23	.20	.23	.18	.23
Liquid 50°, 600 lb bbls..lb.	.08½	.12	.08½	.12	.07	.10
Solid, 50 lb boxes .....lb.	.16	.18	.16	.18	.14	.18
Sticks .....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls ..lb.	.42	.43	.42	.43	.42	.43
Gall Extract .....lb.	.18	.20	.18	.20	.18	.20
Gambier, com 200 lb bgs ..lb.	...	.08	.04	.08	.03	.07
Singapore cubes, 150 lb bgs .....100 lb.	...	.07¼	.05	.07¼	.05¼	.08
Gelatin, tech, 100 lb cs ...lb.	.50	.55	.45	.55	.45	.50
Glauber's Salt, tech, c-l wks .....100 lb.	1.10	1.30	1.10	1.30	1.00	1.70
Anhydrous, see Sodium Sulfate.						
Glucose (grape sugar) dry 70-80° bgs, c-l, NY ..100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb. bgs .....100 lb.	...	2.33	...	2.33	...	2.33
Glue, bone, com grades, c-l bgs .....lb.	...	.08	.07	.12½	...	...
Better grades, c-l, bgs lb.	.09	.09½	.09½	.16	...	...
Casein, kgs .....lb.	.18	.22	.18	.22	...	...
Hide, high grd, c-l, bgs..lb.	.23	.28	.23	.28	...	...
Med grd, c-l, bgs .....lb.	.19	.23	.19	.23	...	...
Low grd, c-l, bgs .....lb.	.13½	.19	.13½	.19	...	...
Glycerin, CP, 550 lb drs ..lb.	.14	.14½	.11	.14½	.10¼	.11
Dynamite, 100 lb drs ...lb.	.13¾	.14¼	.10	.14¼	.07½	.10¼
Saponification, drs .....lb.	.10	.10½	.06¾	.10½	.05	.08
Soap Lye, drs .....lb.	.09	.09¼	.06¼	.09⅛	.04	.06½

l + 10; *m* + 50.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Glyceryl Phthalate ....lb.	...	.28	...	.28	...	...
Glyceryl Stearate, bbls....lb.	...	.18	...	.18	.17	.18
Glycol Phthallate .....lb.	...	.28	...	.28	...	...
Glycol Stearate .....lb.	...	.18	.18	.20	...	...
Graphite, Crystalline, 500 lb bbls .....lb.	.04	.05	.04	.05	.04	.05
Flake, 500 lb. bbls .....lb.	.08	.16	.08	.16	.08	.16
Amorphous, bbls .....lb.	.03	.04	.03	.04	.03	.04
GUMS						
Gum Aloes, Barbadoes ....lb.	.87	.90	.85	.90	.85	.90
Animi (Zanzibar) bean & pea, 250 lb cases .....lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases ....lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts .....lb.	.09½	.10½	.07¾	.10⅜	.05¾	.08¼
White sorts, No. 1, bgs .....lb.	.21	.22	...	...	...	...
No. 2, bgs .....lb.	.20	.21	...	...	...	...
Powd, bbls .....lb.	.13½	.14½	...	...	...	...
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY .....lb.	.02½	.10½	.02½	.10½	.03	.05
Egyptian, 200 lb cases, f.o.b. NY .....lb.	.12	.15	.12	.15	.13	.15
California, f.o.b. NY, drs .....ton	29.00	55.00	...	...	...	...
Benzoin Sumatra, USP, 120 lb cases .....lb.	.18	.18½	.18½	.23	.17	.23
Copal Congo, 112 lb bgs, clean, opaque ..... lb.	.24⅛	.24⅝	.24⅛	.28	.16½	.28
Dark, amber .....lb.	.08¾	.09¼	.08⅝	.10½	.06	.10½
Light, amber .....lb.	.14⅝	.14⅞	.14⅜	.19	.08	.19
Copal, East India 180 lb bgs						
Macassar pale bold ....lb.	.09⅞	.10⅜	.09⅞	.10½	.05	.13
Chips .....lb.	.05½	.06	...	...	...	...
Nubs .....lb.	.08½	.09	...	...	...	...
Dust .....lb.	.03¾	.04¼	...	...	...	...
Singapore						
Bold .....lb.	.16½	.17	.16	.17	.05½	.17
Chips .....lb.	.04⅝	.05⅛	...	...	...	...
Nubs .....lb.	.10½	.11	...	...	...	...
Dust .....lb.	.03¾	.04¼	...	...	...	...
Copal Manilla, 180-190 lb baskets, Loba A .....lb.	.11¾	.12¼	.11⅜	.14½	.09	.13½
Loba B .....lb.	.10¼	.10¾	.10¼	.13½	.08	.13
Loba C .....lb.	.10⅛	.11⅜	.09¾	.12	.07	.12
MA sorts .....lb.	.06¾	.07¼	.06½	.07½	.05	.07
DBB .....lb.	.08	.08½	.08	.09½	.05¾	.09½
Dust .....lb.	.04⅞	.05⅜	...	...	...	...
Copal Pontianak, 224 lb cases, bold genuine .....lb.	.16⅛	.16⅝	.16⅛	.19	.14½	.18
Mixed .....lb.	.14	.14½	...	...	...	...
Chips .....lb.	.06⅞	.07⅞	...	...	...	...
Nubs .....lb.	.10¼	.10¼	...	...	...	...
Split .....lb.	.13⅞	.14⅜	...	...	...	...
Dammar Batavia, 136 lb cases						
A .....lb.	.19¾	.20¼	...	...	...	...
B .....lb.	.18¾	.19¼	...	...	...	...
C .....lb.	.16¾	.17¼	...	...	...	...
D .....lb.	.11¾	.12¼	...	...	...	...
A/D .....lb.	.14	.14½	...	...	...	...
A/E .....lb.	.11¾	.12¼	...	...	...	...
E .....lb.	.07	.07½	.07	.09½	.05½	.09½
F .....lb.	.06⅛	.06⅜	.05½	.06⅝	.05½	.06
Singapore						
No. 1 .....lb.	.16½	.17	.15½	.18	.09½	.18
No. 2 .....lb.	.10¾	.11¼	.09⅜	.11	.07	.11½
No. 3 .....lb.	.05⅛	.05⅝	.05⅛	.07	.04½	.07½
Chips .....lb.	.09¼	.09¾	.09	.10¼	...	...
Dust .....lb.	.05¼	.05¾	.05	.06	...	...
Seeds .....lb.	.06⅝	.07¼	.06	.07¾	...	...
Ester .....lb.	.07¼	.08	...	...	...	...
Gamboge, pipe, cases .....lb.	.60	.65	.57	.65	.42	.65
Powdered, bbls .....lb.	.70	.75	.67	.75	.50	.70
Ghatti, sol. bgs .....lb.	.09	.09½	.09	.09½	.06	.09½
Karaya, pow bbls xxx ....lb.	.23	.25	.23	.25	...	...
xx .....lb.	.15	.16	.15	.16	...	...
No. 1 .....lb.	.08	.09	.08	.11	...	...
No. 2 .....lb.	.07	.08	.07	.09	...	...
Kauri, NY, San Francisco, Brown XXX, cases ....lb.	.60	.60½	...	...	...	...
BX .....lb.	.33	.33½	...	...	...	...
B1 .....lb.	.19	.19½	...	...	...	...
B2 .....lb.	.14½	.15	...	...	...	...
B3 .....lb.	.12	.12½	...	...	...	...
Sale XXX .....lb.	.65	.65½	...	...	...	...
No. 1 .....lb.	.40	.40½	...	...	...	...
No. 2 .....lb.	.22	.22½	...	...	...	...
No. 3 .....lb.	.15	.15½	...	...	...	...
Kino, tins .....lb.	.75	.80	.75	.80	...	...
Mastic .....lb.	.46	.46½	.35	.55½	.26⅞	.40
Sandarac, prime quality, 200 lb bgs & 300 lb cks ...lb.	.37½	.38	.37½	.50	.21	.50
Senegal, picked bgs .....lb.	.20	.21	17	.21	...	...
Sorts .....lb.	.09⅜	.10	.08	.10	...	...
Thus, bbls .....280 lbs.	...	10.75	9.50	10.75	...	...
Strained .....280 lbs.	...	10.75	9.50	10.75	...	...
Tragacanth, No. 1, cases .....lb.	1.15	1.20	1.00	1.20	.65	1.00
No. 2 .....lb.	1.05	1.10	...	...	...	...
No. 3 .....lb.	.95	1.00	...	...	...	...
No. 4 .....lb.	.85	.90	...	...	...	...
No. 5 .....lb.	.75	.80	...	...	...	...
No. 6, bgs .....lb.	.14	.15	...	...	...	...
Sorts, bgs .....lb.	.11	.12	...	...	...	...
Yacca, bgs .....lb.	.03¼	.03¾	.03¼	.04	...	...

The following

ORGANIC CHEMICALS

ARE AVAILABLE FOR SPOT OR CONTRACT SALE

MICHLER'S KETONE
MIXED-MONONITROCHLORO-BENZENES
MIXED-MONONITROTOLUENES
MIXED-MONONITROXYLENES
MIXED-TOLUIDINES
MIXED-XYLIDINES
MONOBENZYL PARA-AMINOPHENOL
MONOCHLOROBENZENE
MONOETHYLANILINE
MONOETHYL-ORTHO-TOLUIDINE
NEVILE & WINTHER'S ACID
NITROBENZENE
NITROBENZENE-META-SULFONIC ACID
NITRO FILTERS
OIL OF MIRBANE
ORTHO-AMINOPHENOL
ORTHO-ANISIDINE
ORTHO-DICHLOROBENZENE
ORTHO-NITROANISOLE
ORTHO-NITROCHLOROBENZENE
ORTHO-NITROPHENOL
ORTHO-NITROTOLUENE
ORTHO-TOLUIDINE
ORTHO-TOLUIDINE-META-SULFONIC ACID
PARA-AMINOBENZOIC ACID
PARA-AMINOPHENOL (BASE)
PARA-DICHLOROBENZENE
PARA-NITROANILINE-ORTHO-SULFONIC ACID
PARA-NITROBENZOIC ACID
PARA-NITROCHLOROBENZENE
PARA-NITROPHENOL
PARA-NITROTOLUENE
PARA-PHENETIDINE
PARA-TOLUIDINE
PERI ACID
PHENYL-ALPHA-NAPHTHYLAMINE
PHENYL-BETA-NAPHTHYLAMINE
PHENYL GAMMA ACID
PHENYL-METHYL-PYRAZOLENE
PHENYL PERI ACID
PICRAMIC ACID
PICRIC ACID
RESORCINOL, TECHNICAL
R SALT
S ACID
SCHAEFFER SALT
SODIUM METANILATE
SODIUM NAPHTHIONATE
SODIUM PARA-NITROPHENOLATE
SODIUM PICRAMATE
STABILIZERS
SULFANILIC ACID
SULFUR DIOXIDE
THIOCARBANILIDE
TOLIDINE (BASE)
TRIBUTYLAMINE

DU PONT
REG. U.S. PAT. OFF.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
Organic Chemicals Department
Wilmington, Delaware

Recent CHEMICAL Developments

XII

1. TO IMPREGNATE TEXTILES

Because it is waterproof and resistant to fire, oil, and petroleum greases, Tornesit is a valuable impregnating agent for textiles. Fabrics impregnated with it may be washed in soap solution without harming the finish.

2. FINISH FOR MACHINERY

Parts of many machines are given improved protection against rust, grease, and dirt by a finish of nitrocellulose lacquer.

3. SOLUBILITY OF VINSOL

A table showing the solubility of Vinsol Resins at room temperature in sixty different solvents is contained in a bulletin recently prepared. These resins are practically insoluble in petroleum oils. They are completely or partially soluble in a large number of solvents.

4. FOR THE PAPER INDUSTRY

Manufacturers of cover papers, papers and boards used for containers, and wall papers are using nitrocellulose lacquer to produce a water-resistant glossy finish that does not easily pick up grease and dirt, and that can be readily cleaned with soap and water.

5. MEDICINAL PREPARATIONS

A number of proprietary liniments, ointments, salves, and inhalants contain pine oil. When used as a wet dressing it is a valuable antiseptic and healing agent.

6. LEATHER FINISH

Nitrocellulose lacquer provides for leather an attractive finish that is tough and water-resistant. It comes in all colors and is extensively used to color leather for shoes, upholstery, and other purposes.

7. RECOVERING CELLULOSE FIBRES

Tests show that the use of pine oil in the recovery of cellulose fibres from rag stock increases the absorbency of the recovered fibres and yields a cleaner stock.

More detailed information on any of the above subjects may be secured by filling in this coupon.

HERCULES POWDER COMPANY
INCORPORATED
Wilmington, Delaware

I am interested in items numbered:

Name.....

Address.....

Company.....

IN-22-C

Hematite
Mercuric Chloride

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Hematite crystals, 400 lb bbls .....lb.	.16	.18	.16	.18	.10	.18
Paste, 500 bbls .....lb.	...	.11	...	.11	...	.11
Hemlock 25%, 600 lb bbls wks .....lb.	...	.02⅞	.02⅞	.04½	.03½	.04½
tks .....lb.	...	.02½	...	...	...	...
Hexalene, 50 gal drs wks..lb.	...	.30	...	.30	...	.30
Hexane, normal 60-70°C. Group 3, tks .....gal.	...	.14	...	.14	...	...
Hexamethylenetetramine, drs .....lb.	.37	.39	.37	.39	...	...
Hexyl Acetate, delv drs ...lb.	.12	.12½	.12	.12½	...	...
tks .....lb.	...	.11½	...	...	...	...
Hoof Meal, f.o.b. Chicago unit	...	2.30	1.85	2.60	.75	1.75
South Amer. to arrive unit	...	1.85	1.65	1.80	1.40	1.75
Hydrogen Peroxide, 100 vol, 140 lb cbys .....lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride .....lb.	...	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls lb.	.17	.20	.17	.20	.11	.20
Indigo Madras, bbls .....lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drs .....lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid .....lb.	...	.12	...	.12	...	.12
Iodine, crude .....per kilo	...	15s 1d	...	15s 1d	...	...
Resublimed, kgs .....lb.	...	1.90	1.90	2.30	2.10	3.40
Irish Moss, ord, bales ....lb.	.09	.10	.07	.10	...	...
Bleached, prime, bales ..lb.	.18	.19	.14	.19	...	...
Iron Acetate Liq. 17°, bbls lb.	.03	.04	.03	.04	...	...
Chloride see Ferric Chloride.						
Nitrate, coml, bbls ..100 lb.	2.75	3.25	2.75	3.25	2.50	3.25
Oxide, English .....lb.	.07½	.08¾	.07½	.09	.04	.07
Isobutyl Carbinol (128-132°C) drs, wks .....lb.	.33	.34	.34	.34	...	.34
tks, wks, frt allowed ...lb.	...	.32	.32	.326	...	...
Isopropyl Acetate, tks ....lb.	...	.07½	.07	.07½	...	...
drs, frt allowed .....lb.	.08½	.09	...	...	...	...
Ether, see Ether, isopropyl.						
Keiselguhr, 95 lb bgs, NY, Brown .....ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, brown, broken, f.o.b. NY, bbls .....lb.	...	.09½	.09¼	.09½	.09	.10½
White, broken, bbls ....lb.	...	.11	.11	.11	...	...
cryst bbls .....lb.	...	.10½	.10½	.10½	...	...
gran, bbls .....lb.	...	.11	.11	.11	...	...
powd, bbls .....lb.	...	.11¼	.11¼	.11¼	...	...
Arsenate, East, jobbers, drs .....lb.	.09	.09½	...	...	...	...
Dealers, drs .....lb.	.09¼	.10½	...	...	...	...
West, jobbers, drs .....lb.	...	.09	...	...	...	...
dealers, drs .....lb.	...	.10	...	...	...	...
Linoleate, solid bbls .....lb.	.26	.26½	.26	.26½	...	...
Metal, c-l, NY .....100 lb	...	3.50	3.50	4.25	3.00	4.50
Red, dry, 95% Pb_3O_4, delv .....lb.	.06	.07	.06	.07¾	.06½	.08
97% Pb_3O_4, delv .....lb.	.06¼	.07¼	...	...	...	...
98% Pb_3O_4, delv ....lb.	.06½	.07½	...	...	...	...
Nitrate, 500 lb bbls, wks..lb.	.10	.14	.10	.14	.10	.14
Oleate, bbls .....lb.	.15	.16	.15	.16	.15	.16
Resinate, precip, bbls ...lb.	...	.14	.14	.18½	...	...
Stearate, bbls .....lb.	.22	.23	.22	.23	...	...
White, 500 lb bbls, wks..lb.	.06½	.07	.06½	.07	.06	.07
Sulfate, 500 lb bbls, wks lb.	...	.06	...	.06	.05½	.06
Lime, chemical quicklime, f.o.b., wks, bulk .....ton	7.00	7.25	...	...	...	...
Hydrated, f.o.b., wks ..ton	8.50	12.00	...	...	...	...
Lime Salts, see Calcium Salts.						
Lime sulfur, sol, jobbers, tks .....gal.	...	.10	...	...	...	...
drs .....gal.	.13½	.15½	...	...	...	...
Dealers, tks .....gal.	...	.10½	...	...	...	...
drs .....gal.	.14	.16½	...	...	...	...
Linseed cake, bgs .....ton	31.50	30.00	21.50	33.00	...	...
Linseed Meal, bgs .....ton	...	40.00	30.50	41.00	28.00	37.00
Litharge, coml, delv, bbls..lb.	.05	.06	.051	.06¾	.05	.07
Lithopone, dom, ordinary, delv, bgs .....lb.	.04½	.04¾	.04½	.04¾	...	...
bbls .....lb.	.04¾	.05	.04¾	.05	...	...
High strength, bgs .....lb.	.06	.06¼	.06	.06¼	...	...
bbls .....lb.	.06¼	.06½	.06¼	.06½	...	...
Titanated, bgs .....lb.	.06	.06¼	.06	.06¼	...	...
bbls .....lb.	.06¼	.06½	.06¼	.06½	...	...
Logwood, 51°, 600 lb bbls lb.	.08½	.10½	.08½	.12½	.05	.12½
Solid, 50 lb boxes .....lb.	.13½	.17½	.13½	.17½	.08	.17½
Sticks .....ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch .....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl ton	60.00	65.00	55.00	65.00	46.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks .....lb.	.06	.06½	.06	.06½	.05¾	.06½
Chloride flake, 375 lb drs, c-l, wks .....ton	36.00	39.00	34.00	39.00	34.00	36.00
Magnesium fluosilicate, crys, 400 lb bbls, wks .... lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb. bbls .....lb.	...	.42	...	.42	...	.42
Heavy, 250 lb bbls ..lb.	...	.50	...	.50	...	.50
Palmitate, bbls .....lb.	.22	.23	.21	.23	...	...
Stearate, bbls .....lb.	.19	.22	...	...	...	...
Linoleate, lig drs .....lb.	.18	.19	.18	.19	...	...
Resinate, fused, bbls ..lb.	.08¼	.08½	.08¼	.08½	...	...
precip, bbls .....lb.	...	.12	.11½	.12½	...	...
Manganese Borate, 30%, 200 lb bbls .....lb.	.15	.16	.15	.16	.15	.16
Chloride, 600 lb cks ....lb.	.09	.12	.07	.12	.07	.08
Dioxide, tech (peroxide), drs .....lb.	.03¾	.06	.03¾	.06	.03½	.06
Mangrove 55%, 400 lb bbls lb.	...	.04	...	.04	...	.04
Bark, African .....ton	...	29.00	26.00	32.00	22.00	31.00
Marble Flour, blk .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercuric chloride .....lb.	.73	.93	.73	.93	.67	.87

Current — Mercury Orthodichlorobenzene

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Mercury metal ...76 lb. flasks	...	73.50	66.50	79.00	48.00	69.00
Meta-nitro-aniline .....lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls .....lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb bbls .....lb.	.80	.84	.80	.84	.80	.84
Peroxide, 100 lb cs ....lb.	1.20	1.25	1.20	1.25	1.00	1.25
Silicofluoride, bbls .....lb.	.09	.10	.09	.11	.08¾	.11
Stearate, bbls .....lb.	.19	.20	.19	.20	.16½	.20
Meta-toluene-diamine, 300 lb bbls .....lb.	.67	.69	.67	.69	.67	.69
Methanol, 95%, frt allowed, drs .....gal. *o*	.37½	.58	.37½	.58	...	...
tks, frt allowed ....gal. *o*	.33	.36½	.33	.36½	...	...
97% frt allowed, drs gal. *o*	.38½	.59	.38½	.59	...	...
tks, frt allowed ....gal. *o*	.34	.37½	.34	.37½	...	...
Pure, frt allowed, drs gal. *o*	.40	.61	.40	.61	...	...
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	...	...
Synthetic, frt allowed, drs .....gal. *o*	.40	.61	.40	.61	...	...
tks, frt allowed ....gal. *o*	.35½	.39	.35½	.39	...	...
Methyl Acetate, dom, 98-100%. drs .....lb.	.18	.18½	.18	.18½	...	...
Synthetic, 410 lb drs ..lb.	.16	.17	.16	.17	...	...
tks .....lb.	...	.15	.15	.15	...	...
Acetone, frt allowed, drs .....gal. *p*	.53½	.73½	...	...	...	...
tks, frt allowed, drs gal. *p*	.49	.52½	...	...	...	...
Synthetic, frt allowed, east of Rocky M., drs gal. *p*	.57½	.60	.57½	.60	...	...
tks, frt allowed	...	.53	...	...	...	...
West of Rocky M., frt allowed, drs ....gal. *p*	.60	.63	...	...	...	...
tks, frt allowed ..gal. *p*	...	.56	...	...	...	...
Hexyl Ketone, pure, drs lb.	...	.60	.60	1.20	...	1.20
Anthraquinone .....lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks .....lb.	...	.10½	.10½	.10½	...	...
Chloride, 90 lb cyl .....lb.	...	.45	.45	.45	.45	.45
Ethyl Ketone, tks .....lb.	...	.07½	.07½	.07½	...	...
Propyl carbinol, drs ...lb.	.60	.75	.60	.75	...	...
Mica, dry grd, bgs, wks ..lb.	35.00	...	...	...	...	...
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	2.50	3.00
Molasses, blackstrap, tks, f.o.b. NY .....gal.	.06	.06⅛	.06	.09	.04½	.07
Monoamylamine, drs, wks lb.	...	1.00	...	1.00	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monomethylparaminosulfate, 100 lb drs .....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls..lb.	...	.04¼	.03¾	.04¼	.03¼	.04¼
50% Solid, 50 lb boxes lb.	.06	.06¼	.06	.06¼	.05	.06¼
J1 bgs .....ton	...	24.50	24.50	32.00	27.00	35.00
J2 bgs .....ton	...	15.75	15.75	18.00	15.00	22.00
R2 bgs .....ton	16.00	16.50	16.25	18.00	15.00	22.00
Naphtha. v.m. & p. (deodorized) see petroleum solvents.						
Naphthalene, dom, crude, bgs, wks .....lb.	1.65	2.40	...	...	...	...
Imported, cif, bgs ....lb.	...	1.90	1.75	1.90	1.75	2.15
Dyestuffs, bgs, bbls, Eastern wks .....lb.	...	.04¾	...	...	...	...
Balls, ref'd, bbls, Eastern wks .....lb.	...	.05½	...	...	...	...
Flakes, ref'd, bbls, Eastern wks .....lb.	...	.05½	...	...	...	...
Dyestuffs, bgs, bbls, Mid-West wks .....lb. *q*	...	.05¼	...	...	...	...
Balls, ref'd, bbls, Mid-West wks .....lb. *q*	...	.06	...	...	...	...
Flakes, ref'd, bbls, Mid-West wks .....lb. *q*	...	.06	...	...	...	...
Nickel Chloride, bbls .....lb.	.18	.19	.18	.19	.17	.19
Oxide, 100 lb kgs, NY..lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.11½	.12	.11½	.12	.11	.13
Single, 400 lb bbls, NY lb.	.11½	.12	.11½	.12	.11	.12
Metal ingot .....lb.	...	.35	.35	.35	.35	.35
Nicotine, free 50%, 8 lb tins, cases	8.25	10.15	8.25	10.15	...	...
Sulfate, 55 lb drs .....lb.	.67	.75	.67	.75	.67	.75
Nitre Cake, blk .....ton	12.00	14.00	12.00	14.00	10.00	14.00
Nitrobenzene, redistilled, 1000 lb drs, wks .....lb.	.09	.11	.09	.11	.08½	.11
tks .....lb.	...	.08½	...	.08½	...	...
Nitrocellulose, c-l-l cl, wks lb.	.27	.34	.27	.34	.27	.33
Nitrogenous Mat'l, bgs, imp .....unit	...	2.60	...	...	...	...
dom, Eastern wks ....unit	2.55	2.60	2.35	3.25	1.50	3.50
dom, Western wks ....unit	...	2.25	...	...	...	...
Nitronaphthalene, 550 lb bbls .....lb.	.24	.25	.24	.25	.24	.25
Nutgalls Aleppy, bgs .....lb.	.19	.20	.18	.20	...	.18
Chinese, bgs .....lb.	.19	.20	.17	.20	.17	.18
Oak Bark Extract, 25%, bbls lb.	...	.03½	.03⅜	.03½	...	...
tks .....lb.	...	.02¾	...	...	...	...
Orange-Mineral, 1100 lb cks NY .....lb.	.09¼	.10	.09¼	.10½	.09½	.10¾
Orthoaminophenol, 50 lb kgs. lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.82	.84	.82	1.15	1.00	1.15
Orthochlorophenol, drs ....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drs .....lb.	.13	.15	.13	.15	.13	.15
Orthodichlorobenzene, 1000 lb drs .....lb.	.05½	.06	.05½	.06	.05½	.06

o Country is divided in 5 zones, prices varying by zone. In drum prices range covers both zone and c-l and lcl quantities in the 5 zones; in each case, bbl. prices are 2½c higher; synthetic is not shipped in bbls.; *p* Country is divided into 5 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

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Laurate — Rincinoleate
Linoleate — Stearate
Undecylenate

And the corresponding Sodium and Potassium Soaps

Orthonitrochlorobenzene Phloroglucinol — Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Orthonitrochlorobenzene, 1200 lb drs, wks ..... lb.	.28	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs, wks ..... lb.	.05½	.05½	.06	.05½	.06
Orthonitrophenol, 350 lb drs ..... lb.	.52	.52	.80	.52	.90
Orthotoluidine, 350 lb bbls, l-c-l ..... lb.	.14½	.14	.15	.14	.22
Orthonitroparachlorphenol, tins ..... lb.	.70	.70	.75	.70	.75
Osage Orange, cryst .... lb.	.17	.16	.25	.16	.17
51 deg liquid ..... lb.	.07	.07	.07¾	.06	.07¾
Powd, 100 lb bgs ..... lb.	.14½	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs					
122-127 deg M P ..... lb.	.04	.04	.04¾	.02	.04½
128-132 deg M P ..... lb.	.05	.04¾	.0515	.03⅛	.04¾
133-137 deg M P ..... lb.	.0575	.05	.06	.043	.05¾
Para aldehyde, 110-55 gal drs ..... lb.	.16	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ..... lb.	...	.52	.85	.52	.60
Aminohydrochloride, 100 lb kgs ..... lb.	1.25	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	.78	1.05	.78	.80
Chlorophenol, drs ..... lb.	.50	.50	.65	.50	.65
Coumarone, 330 lb drs .. lb.	...	...	...	...	...
Cymene, refd, 110 gal dr ..... gal.	2.25	2.25	2.50	2.25	2.50
Dichlorobenzene 150 lb bbls wks ..... lb.	.16	.16	.20	.15	.18
Nitroacetanilid, 300 lb bbls ..... lb.	.45	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ..... lb.	.48	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs, wks ..... lb.	.23½	.23½	.24	.23½	.26
Nitro-orthotoluidine, 300 lb bbls ..... lb.	2.75	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.45	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb bbls ..... lb.	.92	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	.35	.35	.37	.29	.37
Phenylenedamine, 350 lb bbls ..... lb.	1.25	1.25	1.30	1.15	1.30
Para Tertiary amyl phenol, wks, drs ..... lb.	...	...	.50	...	...
Toluenesulfonamide, 175 lb bbls ..... lb.	.70	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls, wks ..... lb.	.20	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ..... lb.	.56	.56	.60	.56	.60
Paris Green, Arsenic Basis					
100 lb kgs ..... lb.	...	.23	.24	...	.24
250 lb kgs ..... lb.	...	...	.22	...	.23
Perchlorethylene, 50 gal drs ..... lb.	...	.15	...	.15	...
Persian Berry Ext, bbls .. lb.	.55	Nom.	.55	Nom.	.25 Nom.
Pentane, normal, 28-38°C,					
group 3 tks ..... gal.	...	.09	.09	.09	...
drs, group 3 ..... gal.	.10	.15	...	...	...
Petrolatum, dark amber, bbls ..... lb.	.02⅝	.02⅞	...	...	...
Light, bbls ..... lb.	.02⅞	.03⅛	...	...	...
Medium, bbls ..... lb.	.02¾	.03	...	...	...
Dark green, bbls ..... lb.	.02½	.02¾	...	...	...
White, lily, bbls ..... lb.	.06⅜	.06½	...	...	...
White, snow, bbls ..... lb.	.07⅜	.07½	...	...	...
Red, bbls ..... lb.	.02½	.02¾	...	...	...
Petroleum Ether, 30-60°,					
group 3, tks ..... gal.	...	.13	.11	.13	...
drs, group 3 ..... gal.	.15	.16	.15	.17	...

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ..... gal.	...	.06⅞	...	...	...
Bayonne, tks, wks .. gal.	...	.09	...	...	...
West Coast, tks .... gal.	...	.15	...	...	...
Hydrogenated naphthas, frt allowed East, tks ... gal.	...	.17½	...	...	...
No. 2, tks ..... gal.	...	.22½	...	...	...
No. 3, tks ..... gal.	...	.17½	...	...	...
No. 4, tks ..... gal.	...	.22½	...	...	...
Lacquer diluents, tks,					
Bayonne ..... gal.	.12	.12½	.12	.12½	...
Group 3, tks ..... gal.	...	.07⅞	.06⅞	.08⅜	.06¼ .08⅛
Naphtha, V.M.P., East, tks, wks ..... gal.	...	.09	.09	.09½	.08½ .09½
Group 3, tks, wks ... gal.	...	.06⅞	.06¼	.07¼	... ...
Petroleum thinner, East, tks, wks ..... gal.	...	.09	.09	.09	... ...
Group 3, tks, wks ... gal.	...	.05⅞	.05⅞	.06⅜	... ...
Rubber Solvents, stand grd, East, tks, wks ..... gal.	...	.09	.09	.09½	.09 .09½
Group 3, tks, wks .. gal.	...	.06⅞	.06⅜	.06⅞	.05 .06⅞
Stoddard Solvent, East, tks, wks ..... gal.	...	.09	.09	.09½	.09 .09½
Group 3, tks, wks ... gal.	...	.06⅜	.05¾	.07⅛	.04½ .06⅝
Phenol, 250-100 lb drs .... lb.	.14¼	.15	.14¼	.15	.14¼ .15
Phenyl-Alpha-Naphthylamine, 100 lb kgs ..... lb.	...	1.35	...	1.35	... 1.35
Phenyl Chloride, drs .... lb.	...	.16	...	.16	... ...
Phenylhydrazine Hydrochloride ..... lb.	2.90	3.00	2.90	3.00	2.90 3.00
Phloroglucinol, tech, tins .. lb.	15.00	16.50	15.00	16.50	... ...
CP, tins ..... lb.	20.00	22.00	20.00	22.00	... ...

Current — Phosphate Rock, Rosin Oil

		Current Market	1934 Low	1934 High	1933 Low	1933 High
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis	ton	...	3.25	2.85	3.25	2.75	3.25
70% basis	ton	...	3.75	3.35	3.75	3.25	3.90
72% basis	ton	...	4.25	3.85	4.25	3.75	4.35
75-74% basis	ton	...	5.25	4.90	5.30	4.75	5.50
75% basis	ton	...	5.35	5.05	5.40	4.85	5.75
77-80% basis	ton	...	6.25	5.90	6.25	5.75	6.30
Tennessee, 72% basis	ton	...	4.75	4.75	5.00	...	5.00
Phosphorous Oxychloride 175 lb cyl	lb.	.16	.20	.16	.20	.16	.23
Red, 110 lb cases	lb.	.44	.45	.44	.45	.40	.45
Yellow, 110 lb cs, wks	lb.	.28	.33	.28	.33	.27½	.33
Sesquisulfide, 100 lb cs	lb.	.38	.44	.38	.44	.38	.44
Trichloride, cyl	lb.	.16	.20	.16	.20	.16	.23
Phthalic Anhydride, 100 lb drs, wks	lb.	.14½	.15½	.14½	.15½	.13½	.16
Pine Oil, 55 gal drs or bbls							
Destructive dist	lb.	.48	.50	.48	.62	.59	.62
Steam dist wat wh bbls	gal.	.64	.65	.64	.65	...	...
tks	gal.	...	.59	...	...	...	...
Straw color, bbls	gal.	...	.59	...	...	...	...
tks	gal.	...	.54	...	...	...	...
Pitch Hardwood, wks	ton	...	20.00	...	20.00	20.00	25.00
Burgundy, dom, bbls, wks	lb.	...	.03½	...	...	...	...
Imported	lb.	.11	.13	...	...	...	...
Coaltar, bbls, wks	ton	...	19.00	...	...	...	...
Petroleum, see Asphaltum in Gums' Section.							
Pine, bbls	bbl.	3.75	4.25	...	...	...	...
Stearin, drs	lb.	.03	.04½	...	...	...	...
Platinum, refd	oz.	35.00	36.00	35.00	38.00	24.00	38.00

POTASH

Potash, Caustic, wks, sol	lb.	.06¼	.06½	.06¼	.07⅜	.06⅛	.07⅜
flake	lb.	.07	.07⅜	.07	.08¼	.0705	.08¼
Liquid tks	lb.	...	.02⅞	.02⅞	.03⅜	...	...
Potash Salts, Rough Kainit 14% basis	ton	...	8.50	8.50	9.70	...	9.70
Manure Salts, imported							
20% basis, blk	ton	...	8.60	8.60	12.00	...	12.00
30% basis, blk	ton	...	12.90	12.90	19.15	...	19.15
Domestic, cif ports, blk unit		...	.43	...	...	...	...
Potassium Acetate	lb.	.26	.28	.26	.28	.27	.28
Potassium Muriate, 80% basis bgs	ton	...	22.00	22.00	37.15	...	37.15
Dom, blk	unit	...	.40	...	...	...	...
Pot & Mag Sulfate, 48% basis bgs	ton	...	22.50	22.50	25.00	25.00	27.80
Potassium Sulfate, 90% basis bgs	ton	...	35.00	35.00	42.15	42.15	47.50
Potassium Bicarbonate, USP 320 lb bbls	lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb cks	lb.	.08⅛	.08⅝	.08⅛	.08⅝	.07¼	.08⅝
Binoxalate, 300 lb bbls	lb.	.22	.23	.14	.23	.14	.17
Bisulfate, 100 lb kgs	lb.	.35	.36	.33	.36	.16	.30
Carbonate, 80-85% calc 800 lb cks	lb.	.07½	.07⅞	.07	.07⅞	.04⅞	.07½
liquid, tks	lb.	...	...	...	...	...	...
drs, wks	lb.	...	...	...	...	...	...
Chlorate crys, powd, 112 lb kgs, wks	lb.	...	.09¼	.08½	.09¼	.08	.09
gran, kgs	lb.	.12	.13	...	...	...	...
powd, kgs	lb.	.08¼	.09¼	...	...	...	...
Chloride, crys, bbls	lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kgs	lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb cases	lb.	.55	.57½	.55	.60	.50	.60
Iodide, 75 lb bbls	lb.	...	1.40	1.40	2.70	2.35	2.70
Metabisulfite, 300 lb bbls	lb.	...	.15	.10½	.15	.10½	.11
Oxalate, bbls	lb.	.16	.24	.16	.24	.16	.24
Perchlorate, cks, wks	lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys, 500 & 1000 lb drs, wks	lb.	.18½	.19½	.18½	.19½	.17½	.19½
Prussiate, red, 112 lb kgs	lb.	.39	.41	.35	.39	.39	.41
Yellow, 500 lb casks	lb.	.18	.19	.18	.19	.16½	.19
Tartrate Neut, 100 lb kgs	lb.	...	.21	...	.21	...	.21
Titanium Oxalate, 200 lb bbls	lb.	.32	.35	.32	.35	...	...
Propane, group 3, tks		...	.07	...	.07	...	.07
Pumice Stone, lump bgs	lb.	.04½	.06	.04½	.06	.04	.06
250 lb bbls	lb.	.05	.07	.05	.07	.04½	.07
Powd, 350 lb bgs	lb.	.02½	.03	.02½	.03	.02½	.03
Putty, coml, tubs	100 lb.	...	2.75	2.25	2.75	2.00	2.25
Linseed Oil, kgs	100 lb.	...	4.50	4.00	4.50	3.40	4.50
Pyridine, 50 gal drs	gal.	...	1.25	...	1.25	.85	1.25
Pyrites, Spanish cif Atlantic ports, blk	unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins	lb.	2.75	3.00	2.75	3.00	...	...
Quebracho, 35% liq tks	lb.	...	.02¼	.02¼	.02⅜	.02	.02⅜
450 lb bbls, c-l	lb.	...	.02¾	.02¾	.02⅞	.02⅜	.02⅞
Solid, 63%, 100 lb bales cif	lb.	...	.03⅝	.02⅞	.03⅝	.02⅜	.03⅜
Clarified, 64%, bales	lb.	...	.03⅞	.03	.03⅞	.02⅜	.03½
Quercitron, 51 deg liq, 450 lb bbls	lb.	.06	.06½	.05½	.06½	.05½	.06
Solid, 100 lb boxes	lb.	.10	.12	.09½	.13	.09½	.13
R Salt, 250 lb bbls, wks	lb.	.44	.45	.40	.45	.40	.44
Resorcinol tech, cans	lb.	.75	.80	.65	.80	.65	.70
Rochelle Salt, cryst	lb.	.14½	.15	.12½	.16	...	...
Powd, bbls	lb.	...	.13½	...	...	...	...
Rosin Oil, bbls, first run	gal.	...	.45	.45	.48	.42	.46
Second run	gal.	...	.48	.48	.53	.46	.51
Third run, drs	gal.	.55	.60	...	...	...	...

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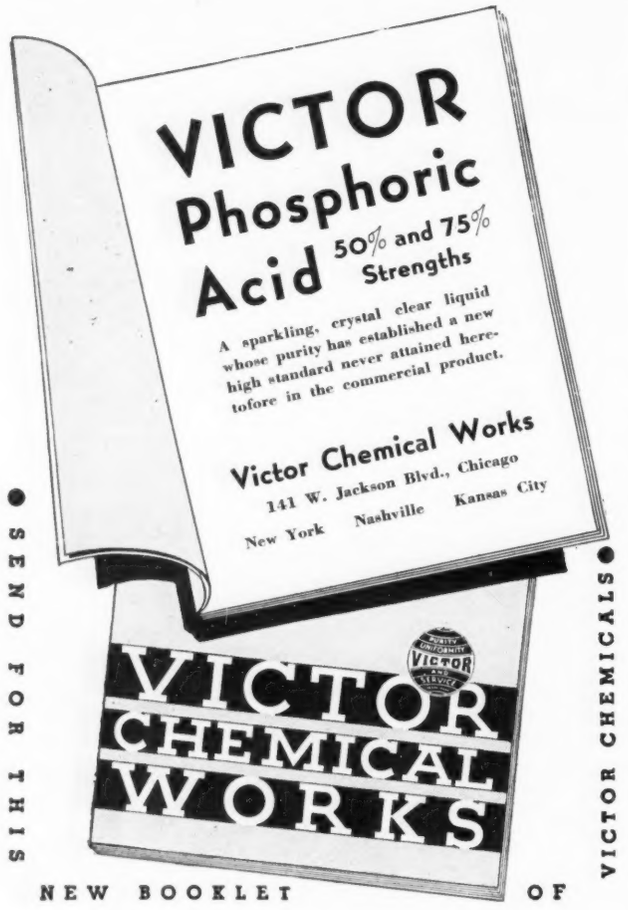

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Rosins
Sodium Nitrate

Prices

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:					
B	...	5.35	4.50	5.75	2.75	5.15
D	...	5.40	4.60	5.85	2.95	5.15
E	...	5.45	4.80	6.50	3.55	5.15
F	...	5.50	5.00	6.75	3.85	5.17½
G	...	5.55	5.05	6.75	3.90	5.17½
H	...	5.70	5.10	6.75	4.00	5.17½
I	...	5.70	5.15	6.75	4.05	5.20
K	...	5.74	5.30	6.75	4.60	5.20
M	...	5.75	5.45	6.80	4.35	5.25
N	...	5.90	5.50	6.80	4.75	5.40
WG	...	6.25	5.70	6.80	4.80	5.60
WW	...	6.50	5.90	6.85	4.85	6.20
Rosins, Gum, Savannah (280 lb unit):						
B	...	4.00	...	...	...	...
D	...	4.05	...	...	...	...
E	...	4.10	...	...	...	...
F	...	4.25	...	...	...	...
G	...	4.25	...	...	...	...
H	...	4.50	...	...	...	...
I	...	4.50	...	...	...	...
K	...	4.50	...	...	...	...
M	...	4.50	...	...	...	...
N	...	4.55	...	...	...	...
WG	...	4.85	...	...	...	...
WW	...	5.15	...	...	...	...
X	...	5.15	...	...	...	...
Rosins, Wood, wks (280 lb unit), FF	4.30	5.25	...	...	...	...
I	4.65	5.50	...	...	...	...
M	5.00	5.75	...	...	...	...
N	5.40	6.05	...	...	...	...
Rosin, Wood. c-l, FF grade, NY	...	5.10	5.10	6.13	...	...
Rotten Stone, bgs mines ..ton	23.50	24.00	23.50	24.00	23.50	24.00
Lump, imported, bbls ..lb.	.05	.07	.05	.07	.05	.07
Selected, bbls .....lb.	.08	.10	.08	.12	.09	.12
Powdered, bbls .....lb.	.02½	.05	.02½	.05	.02	.05
Sago Flour, 150 lb bgs ....lb.	.02¾	.03¾	.02½	.03¾	.02½	.03
Sal Soda, bbls, wks ..100 lb.	...	1.30	1.10	1.30	.90	1.10
Salt Cake, 94-96%, c-l, wks .....ton	13.00	18.00	13.00	18.00	13.00	18.00
Chrome, c-l, wks .....ton	12.00	13.00	12.00	13.00	12.00	13.00
Saltpetre, double refd, gran, 450-500 lb bbls .....lb.	.059	.06⅛	.059	.06¼	.05¾	.06¾
Powd, bbls .....lb.	.069	.07⅛	...	...	...	...
Cryst, bbls .....lb.	.069	.07⅛	...	...	...	...
Satin, White, 550 lb bbls ..lb.	...	.01½	...	.01½	...	.01½
Shellac, Bone dry, bbls ..lb. *r*	.30	.32	.26	.37	.18	.28
Garnet, bgs .....lb.	.26	.27	.26	.32	.15	.20
Superfine, bgs .....lb. *s*	.26	.28	.23	.31	.09½	.18¾
T. N., bgs .....lb. *s*	.23	.25	...	...	...	...
Schaeffer's Salt, kgs .....lb.	.48	.50	.48	.50	.48	.50
Silver Nitrate, vials .....oz.	...	.38½	.31⅜	.40½	...	...
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	...	...
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.25	...	1.25	1.17½	1.25
58% light, bgs .....100 lb.	...	1.23	...	1.25	1.17½	1.23
blk .....100 lb.	...	1.05	...	1.05	...	1.05
paper bgs .....100 lb.	...	1.20	...	1.20	...	1.20
bbls .....100 lb.	...	1.50	...	1.50	...	1.50
Soda Caustic, 76% grnd & flake, drs .....100 lb.	...	3.00	...	3.00	2.90	3.00
76% solid, drs .....100 lb.	...	2.60	...	2.60	2.50	2.60
Liquid sellers, tks, 100 lbs.	...	2.25	...	2.25	2.15	2.25
Sodium Abietate, drs .....lb.	...	.08	.03	.08	...	.03
Acetate, tech, 450 lb bbls, wks .....lb.	.04½	.05	.04½	.05	.04¼	.05
Alignate, drs .....lb.	...	.64	.50	.64	...	.50
Arsenate, drs .....lb.	...	.10½	.07¾	.10½	.07¾	.08¾
Arsenite, liq, drs .....gal.	.40	.75	.40	.75	.05	.75
Benzoate, USP, kgs .. lb.	.46	.48	.45	.48	...	...
Bicarb, 400 lb bbl, wks 100 lb.	...	1.85	1.85	1.85	1.85	1.85
Bichromate, 500 lb cks, wks .....lb.	.06⅛	.06⅝	.06⅛	.06⅝	.044	.07
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03	.036	.02¾	.0335
35-40% sol cbys, wks 100 lb.	1.95	2.10	...	...	...	...
Chlorate, bgs, wks .....lb.	.06¼	.07½	.06¼	.07½	.05¾	.07¾
Chloride, tech .....ton	13.60	16.50	11.40	16.50	11.40	14.00
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.15½	.16½	.15½	.16½	.15½	.16
Fluoride, 90%, 300 lb bbls, wks .....lb.	.07¼	.08¼	.07¼	.09½	.07	.07½
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.19½	.21	.19½	.21	.20	.21
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	2.50	3.00	2.40	3.00	2.40	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.40	2.75	2.40	2.75	2.40	2.65
Iodide .....lb.	...	2.40	2.40	3.50	3.10	3.50
Metanilate, 150 lb bbls ..lb.	.41	.42	.41	.42	.44	.45
Metasilicate, gran, c-l, wks .....100 lb.	2.65	3.05	2.65	3.05	2.65	3.25
cryst, bbls, wks ..100 lb.	...	3.25	...	3.25	...	3.25
Monohydrate, bbls .....lb.	...	.02½	...	.02½	...	.02½
Napthenate, drs .....lb.	...	.09	.09	.13	...	...
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb bgs, c-l, NY .....ton	...	24.80	24.80	26.30	1.26*z*	1.31½*z*
100 lb bgs .....ton	...	25.50	25.50	27.00	...	...
Bulk .....ton	...	23.50	23.50	24.50	...	...

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 3c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; *s* T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y.

	Current Market		1934 Low	1934 High	1933 Low	1933 High
Sodium (continued)						
Nitrite, 500 lb bbls ....lb.	.07¼	.08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls ..lb.	.18	.19	.18	.19	.17	.19
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	...
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	...	2.20	2.10	2.40	2.00	2.40
bgs, wks .....100 lb.	...	2.00	...	...	...	...
tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.60	2.60	2.70	2.15	2.50
bgs, wks .....100 lb.	...	2.60	...	...	...	...
Picramate, 160 lb kgs ..lb.	.67	.69	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl, wks .....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, anhyd, 100 lb bbls .....lb.	...	.15	...	.15	...	...
Silicate, 60°, 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	...	.80	...	.80	.75	.80
tks, wks .....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .....lb.	.04¾	.05	.04¾	.06	.04½	.06
Stannate, 100 lb drs ....lb.	.34	.37	.33½	.37½	.18	.37
Stearate, bbls .....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls..lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-l, wks .....100 lb. *t*	2.35	2.85	2.20	2.85	2.00	2.85
Sulfide, 80% cryst, 440 lb bbls, wks .....lb.	...	.02¼	.02¼	.02½	.02½	.02¾
62% solid, 650 lb drs, c-l, wks .....lb.	...	.03	...	.03	...	.03
Sulfite, cryst, 400 lb bbls, wks .....lb.	.023	.02½	.02¼	.02½	.03	.03¼
Sulfocyanide, bbls .. ..lb.	.32	.42½	.28	.42½	.28	.35
Tungstate, tech, crys, kgs .....lb.	...	.90	.70	.90	.57	.67
Spruce Extract, ord, tks ..lb.	...	.01	...	.01	.00⅞	.01
Ordinary, bbls .....lb.	...	.01½	...	.01½	.01¼	.01½
Super spruce ext, tks .. lb.	...	.01⅝	...	.01⅜	.01¼	.01⅝
Super spruce ext, bbls ..lb.	...	.01⅞	...	.01⅞	.01⅝	.01⅞
Super spruce ext, powd, bgs .....lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs .....100 lb.	3.46	3.56	2.81	3.76	2.29	3.01
Powd, 140 lb bgs ...100 lb.	3.56	3.66	2.71	3.66	2.19	2.91
Potato, 200 lb bgs .....lb.	.05¼	.06	.05¼	.06	.03¾	.06
Imp, bgs .....lb.	.06	.06½	.06	.06½	.04¾	.06½
Rice, 200 lb bbls ..... lb.	.07½	.08½	.07½	.08½	.07	.08½
Wheat, thick bgs .....lb.	...	.08¼	.06¼	.08¼	.05¾	.06¾
Stront um carbonate, 600 lb. bbls, wks .....lb.	.07¼	.07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY .....lb.	.09½	.11	.09½	.11	.07	.11
Sulfur	...	...	...	...	...	...
Crude, f.o.b. mines ....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs ....100 lb.	1.60	2.35	1.60	2.35	1.60	2.35
bbls .....100 lb.	1.95	2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs ..100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.55	3.15	2.55	3.15	2.55	3.15
Extra fine, bgs .....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Superfine, bgs .....100 lb.	2.20	2.80	2.20	2.80	2.20	2.80
bbls .....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .....100 lb.	3.00	3.75	3.00	3.75	3.00	3.75
bbls .....100 lb.	3.35	4.10	3.35	4.10	3.35	4.10
Roll, bgs .....100 lb.	2.35	3.10	2.35	3.10	2.35	3.10
bbls .....100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, red, 700 lb drs, wks .....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs, wks lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl lb.	.08½	.10	.07	.10	.07	.08
Multiple units, wks ....lb.	...	.06½	...	...	...	...
tks, wks .....lb.	...	.04¾	...	...	...	...
Refrigeration, cyl, wks ...lb.	...	.13	...	...	...	...
Multiple units, wks ....lb.	...	.09¼	...	...	...	...
Sulfuryl Chloride .....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	59.00	59.00	58.00	75.00	50.00	75.00
dom, bgs, wks .....ton	...	35.00	...	...	...	...
Superphosphate, 16% bulk, wks .....ton	...	8.50	8.00	8.50	6.50	8.00
Run of pile .....ton	...	8.00	7.50	8.00	6.00	7.50
Talc, Crude, 100 lb bgs, NY .....ton	14.00	15.00	12.00	15.00	12.00	15.00
Refd, 100 lb bgs, NY ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bgs, NY ton	22.00	30.00	27.50	30.00	18.00	30.00
Refd, white, bgs .....ton	45.00	60.00	45.00	60.00	35.00	60.00
Italian, 220 lb bgs to arr ton	70.00	75.00	70.00	75.00	48.50	75.00
Refd, white, bgs, NY ton	75.00	80.00	75.00	80.00	50.00	80.00
Tankage Grd, NY ....unit *u*	...	2.50	2.50	3.25	1.70	2.75
Ungrd .....unit *u*	...	2.25	2.00	2.75	2.35	2.60
Fert grade, f.o.b. Chicago .....unit *u*	...	2.10	1.80	2.40	1.40	3.00
South American cif..unit *u*	...	2.75	2.75	3.10	...	2.50
Tapioca Flour, high grade, bgs .....lb.	.0215	.05	.0215	.05	.03	.05
Tar Acid Oil, 15%, drs gal.	.21	.22	.21	.22	.20	.22
25%, drs .....gal.	.23	.24	.23	.24	.22	.24
Tar, pine, delv, drs .....gal.	.25	.26	...	...	...	...
tks, delv .....gal.	...	.20	...	...	...	...
Tartar Emetic, tech .....lb.	.22¾	.23	.23	.23	...	...
USP, bbls .....lb.	.28	.28½	.27	.28½	...	...
Terpineol, den grd, drs ...lb.	.13¾	.14¾	...	...	...	...
tks .....lb.	.13	.14	...	...	...	...
Tetrachlorethane, 50 gal drs lb.	.08½	.09	.08½	.09	.08½	.09
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12	.13
Thiocarbanilid, 170 lb bbl lb.	.20	.25	.20	.25	.25	.28½

t Bags 15c lower; *u* + 10.

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	Current Market	1934 Low	1934 High	1933 Low	1933 High
Tin, crystals, 500 lb bbls, wks ..lb.	.38	.30	.40½	.24	.41
Metal, NY ..lb.	...	.512	.50⅞	.55⅜	.23 .57
Oxide, 300 lb bbls, wks lb.	.56	.58	.55	.60	.27½ .59
Tetrachloride, 100 lb drs, wks ..lb.	.25½	.26	.25½	.28½	.26 .28
Titanium Dioxide, 300 lb bbls ..lb.	.17¼	.19¼	.17¼	.19¼	.17¼ .19¼
Barium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼ .06½
Calcium Pigment, bbls ..lb.	.06¼	.06½	.06¼	.06½	.06¼ .06½
Toluol, 110 gal drs, wks gal.	...	.35	...	.35	... .35
8000 gal tks, frt allowed gal.	...	.30	...	.30	... .30
Toluidine, mixed, 900 lb drs, wks ..lb.	.27	.28	.27	.28	.27 .28
Toner Lithol, red, bbls ..lb.	.75	.80	.75	.85	.80 .95
Para, red, bbls ..lb.	...	.75	.75	.80	... .80
Toluidine, bgs ..lb.	...	1.35	...	1.35	1.35 1.55
Triacetin, 50 gal drs, wks lb.	.32	.36	.32	.36	.32 .36
Triamyl Borate, drs, wks lb.	...	.40	...	.40	... ...
Triamylamine, drs, wks ..lb.	...	1.25	1.00	1.25	... ...
Trichlorethylene, 50 gal drs lb.	.09½	.10	.09½	.10	.09½ .10
Triethanolamine, 50 gal drs ..lb.	.35	.38	.35	.38	.35 .38
Tricresyl Phosphate, drs ..lb.	.21	.23	.19	.26	.19 .26
Triphenyl Guanidine ..lb.	.58	.60	.58	.60	.58 .60
Tripoli, airfloated, bgs, wks ..ton	27.50	30.00	...	...	... ...
Tungsten, Wolframite per unit	15.00	15.25	12.00	15.25	10.00 12.50
Turpentine (Spirits), c-l, NY dock, bbls ..gal.	...	.53	.46¼	.63½	.46¼ .51½
Savannah, bbls ..gal.	...	.48*	.41¼	.58½	... ...
Jacksonville, bbls ..gal.	...	.48*	.41¼	.58½	... ...
Wood Steam dist, bbls, c-l, NY ..gal.	...	.45	.41	.61	.42 .48
Urea, pure, 112 lb cases ..lb.	.15½	.17	.15	.17	.15 .17
Fert grade, bgs c.i.f. ..ton	100.00	120.00	90.00	120.00	82.60 90.00
c.i.f. S.A. points ..ton	100.00	120.00	90.00	120.00	82.60 90.00
Urea Ammonia liq 55% NH_3, tks ..unit	...	.96	...	.96	... ...
Valonia beard, 42%, tannin bgs ..ton	44.00	48.00	39.00	48.00	27.50 42.00
Cups, 32% tannin, bgs ..ton	30.00	32.50	23.00	32.50	17.00 25.00
Mixture, bark, bgs ..ton	...	32.00	...	32.00	22.00 28.00
Vermillion, English, kgs ..lb.	1.56	1.70	1.41	1.73	1.05 1.42
Vinyl Chloride, 16 lb cyl ..lb.	...	1.00	...	1.00	... 1.00
Wattle Bark, bgs ..ton	...	31.50	29.50	34.00	24.00 32.00
Extract, 60°, tks, bbls ..lb.	...	.03¾	.03⅝	.03⅞	.03 .03⅞

WAXES

Wax, Bayberry, bgs ..lb.	.22	.23	.25	.30	.14½ .17
Bees, bleached, white 500 lb slabs, cases ..lb.	...	.33½	.32	.37	.30 .35
Yellow, African, bgs ..lb.	.21½	.22	.16	.22	.13 .20
Brazilian, bgs ..lb.	.23	.25	...	...	... ...
Chilean, bgs ..lb.	.23	.25	...	...	... ...
Refined, 500 lb slabs, cases ..lb.	.27½	.28	.21	.29	.18 .26
Candelilla, bgs ..lb.	.11	.12½	.10¼	.14½	.09 .11
Carnauba, No. 1, yellow, bgs ..lb.	nominal		.30	.39½	.20 .35
No. 2, yellow, bgs ..lb.	.39	.41	.34	.41	... ...
No. 2, N. C., bgs ..lb.	.28	.29	.20	.29	.14 .20
No. 3, Chalky, bgs ..lb.	.21	.23½	...	...	... ...
No. 3, N. C., bgs ..lb.	nominal		.16¼	.24¾	.11½ .17
Ceresin, white, imp, bgs lb.	.43	.45	...	...	... ...
Yellow, bgs ..lb.	.36	.38	...	...	... ...
Domestic, bgs ..lb.	.08	.11	...	...	... ...
Japan, 224 lb cases ..lb.	.06½	.07	.06½	.07½	... ...
Montan, crude, bgs ..lb.	.10½	.11	.10	.11	.03¾ .10
Paraffin, see Paraffin Wax.					
Spermaceti, blocks, cases lb.	.19	.20	.18	.20	.17 .22
Cakes, cases ..lb.	.20	.22	.19	.21	.18 .23
Whiting, 200 lb bgs, c-l, wks ..ton	...	12.00	...	...	... ...
Alba, bgs, c-l, NY ..ton	...	15.00	...	15.00	13.00 15.00
Gliders, bgs, c-l, NY ..ton	...	15.00	...	...	... ...
Wood Flour, c-l, bgs ..ton	18.00	30.00	18.00	30.00	18.00 36.00
Xylol, frt allowed, East 10° tks, wks ..gal.	.27	.29	.27	.29	.29 .29
Coml, tks, wks ..gal.	...	.26	...	.26	... .26
Xylidine, mixed crude, drs lb.	.36	.37	.36	.37	.36 .37
Zinc, Carbonate tech, bbls, NY ..lb.	.09½	.11	.09½	.11	.09½ .11
Chloride fused, 600 lb drs, wks ..lb.	.04½	.05¾	.04¼	.05¼	.05 .05¾
Gran, 500 lb bbls, wks ..lb.	...	.05¾	.05⅛	.06	.05⅜ .06
Soln 50%, tks, wks ..100 lb.	...	2.00	...	2.00	... 3.00
Cyanide, 100 lb drs ..lb.	.36	.41	.36	.41	.38 .39
Zinc Dust, 500 lb bbls, c-l, delv ..lb.	...	.057	.0567½	.071	.04¾ .07½
Metal, high grade slabs, c-l, NY ..100 lb.	...	4.05	4.05	4.75	3.02 5.37
E. St. Louis ..100 lb.	...	3.75	3.70	4.46	... ...
Oxide, Amer, bgs, wks ..lb.	.05¾	.06¼	.05¾	.06¼	.05 .06
French, 300 lb bbls, wks ..lb.	.06½	.10⅞	.05¾	.11⅛	.05¾ .11⅛
Palmitate, bbls ..lb.	.21	.22	.20	.22	.17½ .21
Perborate, 100 lb drs ..lb.	...	1.25	...	1.25	... 1.25
Peroxide, 100 lb drs ..lb.	...	1.25	...	1.25	... 1.25
Resinate, fused, dark, bbls ..lb.	.05¾	.06½	.05¾	.06½	.05¾ .06½
Stearate, 50 lb bbls ..lb.	.18	.21	.18	.21	.15 .19

* Asked, no bids.

	Current Market	1934 Low	1934 High	1933 Low	1933 High
Zinc Sulfate, crys, 400 lb bbl, wks ..... lb.	.028	.033	.02¾	.033	.03	.03½
Flake, bbls ..... lb.	.035	.032	...	...	...	...
Sulfide, 500 lb bbls, delv lb.	.10¾	.11¾	.10¾	.13½	.12	.13½
bgs, delv .. .. lb.	.10½	.11½	...	...	...	...
Sulfocarbolate, 100 lb kgs ..... lb.	.24	.25	.21	.25	.21	.22
Zirconium Oxide, Nat kgs lb.	.02½	.03	.02½	.03	.02½	.03
Pure, kgs ..... lb.	.45	.50	.45	.50	.45	.50
Semi-refined, kgs ..... lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 3, 400 lb bbls. . lb.	.09¾	.10½	.09¾	.10½	.08½	.09¾
Blown, 400 lb bbls ..... lb.	.11½	.12¼	.11½	.12¾	.11¼	.12¾
China Wood, bbls spot NY lb.	...	.09	.07½	.099	.04⅞	.09⅛
Tks, spot NY ..... lb.	...	.084	.07¼	.094	.04¼	.08½
Coast, tks ..... lb.	...	.084	.06⅞	.094	.04⅛	.08⅛
Coconut, edible, bbls NY. . lb.	...	.04⅜	.04¾	.10¾	...	.10¾
Manila, bbls NY ..... lb.	...	.04⅛	.03¾	.04¼	.03⅞	.04¼
Tks, NY ..... lb.	...	.03⅛	.02⅝	.03¼	.02¾	.03¼
Tks, Pacific Coast ... lb.	...	.02⅞	.02¼	.03	.02½	.03⅜
Cod, Newfoundland, 50 gal bbls ..... gal.	.38	Nom.	.34	.40	.19	.35
Copra, bgs, NY ..... lb.	...	.0165	.012	.017	.015½	.019
Corn, crude, bbls, NY .... lb.	...	.10	.04⅝	.10	.04⅝	.07¼
Tks, mills ..... lb.	...	.09	.03½	.09	.02⅞	.06½
Refd, 375 lb bbls, NY .. lb.	...	.11	.05¾	.11	.05¾	.08¾
Cottonseed, see Oils and Fats News Section.						
Degras, American, 50 gal bbls, NY ..... lb.	.03¾	.04⅜	.03¾	.04¾	.02½	.03
English, brown, bbls, NY lb.	.07⅜	.0[illegible]	.03¾	.04	.02⅞	.04
Greases, Yellow .. .. lb.	.04⅝	.04[illegible]	.02⅜	.04⅞	.01¾	.03⅝
White, choice bbls, NY lb.	.04⅝	.05½	.02¾	.05½	.02½	.04⅝
Herring, Coast, tks ..... gal.	.23	Nom.	.15	.23	.11	.23
Lard Oil, edible, prime ... lb.	...	.09¾	...	.09¾	.08½	.10½
Extra, bbls ..... lb.	...	.08½	.07	.08½	.07½	.08¼
Extra, No. 1, bbls ..... lb.	...	.08¼	.06⅜	.08¼	.06	.08
Linseed, Raw, less than 5 bbl lots ..... lb.	...	.101	.095	.105	.08	.12
bbls, c-l spot ..... lb.	...	.093	.087	.101	.072	.11
Tks ..... lb.	...	.087	.081	.095	.066	.104
Menhaden, tks, Baltimore gal.	.20	.24	.15	.25	.09	.15
Refined, alkali, drs .... lb.	...	.052	.052	.069	...	...
Tks ..... lb.	...	.046	.046	.061	...	...
Light pressed, drs ..... lb.	...	.046	.046	.057	...	...
Tks ..... lb.	...	.04	.04	.05	...	...
Neatsfoot, CT, 20° bbls, NY ..... lb.	...	.16½	...	.16½	.11¾	.16¼
Extra, bbls, NY ..... lb.	...	.08½	.07	.08½	.06½	.08¼
Pure, bbls, NY ..... lb.	...	.12	.12	.13	.07¾	.14
Oleo, No. 1, bbls, NY .... lb.	...	.11¼	.06	.11½	.05	.06⅞
No. 2, bbls, NY ..... lb.	...	.10⅞	.05⅜	.11¼	.04¼	.06⅜
Olive, denat, bbls, NY ... gal.	.84	.86	.76	.90	.47	.80
Edible, bbls, NY ..... gal.	1.55	1.70	1.55	1.90	1.30	1.85
Foots, bbls, NY ..... lb.	.07⅛	.07½	.06½	.07½	.04⅜	.06¾
Palm, Kernel, casks ..... lb.	.0285	Nom.	.02½	.04¼	.04	.04¼
Niger, cks ..... lb.	.031	.0340	.031	.03¾	.024	.04½
Peanut, crude, bbls, NY .. lb.	...	.09½	.06½	.09½	.03⅛	.07
Refined, bbls, NY ..... lb.	.10½	.11	.07½	.11	.07½	.11
Perilla, drs, NY ..... lb.	.08½	.08¾	.08¼	.09⅝	.05	.10½
Tks, Coast ..... lb.*	.07⅞	Nom.	.07½	.09	.03¾	.09¾
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY lb.	.08	.082	.08	.082	...	...
Denatured, drs, NY ...gal.	.40	.41	.37	.44	.34	.65
Red, Distilled, bbls ..... lb.	.07⅜	.08⅜	.06⅞	.08⅜	.05⅞	.07⅜
Tks ..... lb.	...	.06½	.06	.06½	.05	.06
Salmon, Coast, 8000 gal tks ..... gal.	.25	Nom.	.15	.21	.11	.18
Sardine, Pac Coast, tks .. gal.	.21	.25	.13	.25	.09½	.20
Refined alkali, drs ..... lb.	.052	.056	...	...	...	...
Tks ..... lb.	...	.046	...	...	...	...
Light pressed, drs ..... lb.	.046	.05	...	...	...	...
Tks ..... lb.	...	.04	...	...	...	...
Sesame, yellow, dom ..... lb.	.11½	.11¾	.07½	.13¼	.08½	.10
White, dos ..... lb.	.11½	.11¾	.08	.13¼	.10	.11
Soy Bean, crude						
Pacific Coast ..... lb.	...	Nom.	...	Nom.	.032	.035
Dom, tks, f.o.b. mills .. lb.	...	.07½	.06	.07½	.027	.085
Crude, drs, NY ..... lb.	.081	.085	.066	.08	.04	.095
Refd, bbls, NY ..... lb.	.086	.097	.071	.092	.04½	.106
Tks ..... lb.	.08	.087	...	...	...	...
Sperm, 38° CT, bleached, bbls NY ..... lb.	.106	.108	.106	.11	...	...
45° CT, bleached, bbls, NY ..... lb.	.099	.101	.099	.103	...	...
Stearic Acid, double pressed dist bgs ..... lb.	.10	.11	.09	.11	.07½	.10
Double pressed saponified bags ..... lb.	.09	.10	.09	.10	.08	.10
Triple pressed dist bgs .. lb.	.12¾	.13¾	.11¾	.13¾	.10¼	.12¾
Stearine, Oleo, bbls ..... lb.	.08¾	.09	.05	.10⅝	.03½	.06¾
Tallow City, extra loose .. lb.	...	.05⅛	.02⅞	.05⅛	.02	.03⅞
Edible, tierces ..... lb.	...	.06½	.04¾	.06½	.03½	.05⅛
Tallow Oil, bbls, c-l, NY lb.	.05¾	.06	.05¾	.06	.05¾	.06
Acidless, tks, NY ..... lb.	...	.07½	.06	.07½	.05	.07
Vegetable, Coast mats .. lb.	.07¼	Nom.	.06	.07¼	.04¼	.06
Turkey Red, single, bbls .. lb.	.07½	...	.07½	...	.06¼	.07½
Double, bbls ..... lb.	.12½	.13	.12½	.13	.08	.13
Whale, crude, coast, tks .. lb.	...	.04	...	...	...	...
Winter bleach, bbls, NY lb.	...	.072	...	.072	...	...
Refined, nat, bbls, NY .. lb.	.068	.07	.068	.07	...	...

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GRADUATE CHEMIST, 1907. Experienced in dyes and intermediates, pharmaceuticals, recovery of precious metals, research on lacquers, enamels, solvents, nitro-cellulose. Box 617, CHEMICAL INDUSTRIES.

CHEMICAL ENGINEER, B.S. 1923. Married. Ten years' experience in research, development, plant design, operations, Reserve Officer, Engineers, U. S. A. Box 615, CHEMICAL INDUSTRIES.

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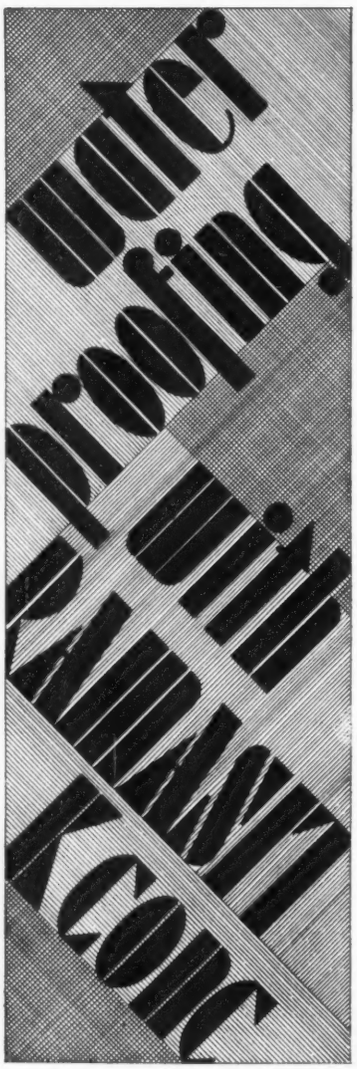

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"We"—Editorially Speaking

One of our most astute and aggressive scouts, just back from the Chemical Engineers' meeting, at Pittsburgh, reports that after a long conference with Harry Curtis, he finds that the Tennessee Valley Authority is going to make cheap phosphoric acid at Muscle Shoals, no matter how much it costs!

❖❖❖❖

We have been caught in a social *faux pas*, a tactical error, a political blunder, a howling mistake, or what have you. In the news item reporting the moving of a more or less well-known alkali company into the more or less well-known Lincoln Building, we listed among the other tenants six more or less well-known chemical firms. But we omitted from that list the very well-known firm of Chew, Chew and Chew. John Aldridge Chew, Esq. (pres., v.p., sect'y, and treas.), of Scarsdale, New York, and Berryville, Virginia, writes to us: "What type of business am I conducting in the Lincoln Building?!" We give up, John; we never were good at riddles anyway.

❖❖❖❖

"The task before a business man today," opines Edward A. Filene, "is not learning business but unlearning what he once thought he knew about business." The more you think about it, the wiser that saying becomes.

❖❖❖❖

We have a real live author in our midst. John Uri Lloyd has just published "Our Willie," a story of the Kentucky mountains; a continuation of his former novel, "Stringtown on the Pikes".

❖❖❖❖

And speaking of taxes—as who isn't these days—during the Civil War the duty on sulfur, and it all came from Sicily in those days, was $6 a ton.

❖❖❖❖

Did you know—that the first sales manager of the Dow Chemical Company, Rupert Paris, is the head of a flourishing insurance agency in Detroit.

That just 60 years ago Caesar Grasselli won a box of cigars from Lammot du Pont, the elder, because he could produce and deliver a tank car of sulfuric acid of the hitherto uncommercial strength of 97%. The present Lammot du Pont has that original cigar box.

❖❖❖❖

Donald Richberg said to the radio audience: "Section 7A has been much misunderstood"—you're telling us!

❖❖❖❖

"Much of the best chemical engineering is only a knowledge of freight rates," said H. O. Chute, at the Chemists' Club round table, and the Board of Governors are seriously considering censoring him for spreading subversive propaganda for the Traffic Club.

❖❖❖❖

All editors feel called upon in the first issue of a new organ to boldly proclaim the purpose for which it stands. Horace Greeley was no exception, neither is Carl Hazard. In "Witcombings," a house organ he issues for Wishnick-Tumpeer, he announces: "through it we hope to amuse, instruct and stimulate." And does the "eyeful" in the rubber bathing suit on the opposite page fulfill his promise. Well, see for yourself.

❖❖❖❖

Ancient art of brewing is now "officially" honorable—Our revered contemporary, "*I. & E. C.*," starts out the November issue with two technical articles on the subject.

❖❖❖❖

To quote M. C. Rorty: "There is probably no question currently under discussion which is more in need of clarification than that of the schedules of normal working hours to which it is socially and economically desirable that we should return when the special conditions of the present emergency have passed," and we have abstracted, from his article in *The Management Review*, the vital points of his discussion of this unnatural condition.

❖❖❖❖

We have had one hundred and seventeen suggestions—good, bad, and indifferent—for our request for a better trade mark than the head of Mercury in the benzene ring. A number of them are unprintable, but the one we like best is a "dumb-bell rampant".

❖❖❖❖

Here's hoping that you wax fat and sleek during 1935 on a diet of alphabet soup.

❖❖❖❖

No doubt you've finished all your Christmas shopping but what about your New Year's resolutions? Here's a good suggestion: why not a personal copy of CHEMICAL INDUSTRIES mailed to you each month at your home address, so you won't have to fight over the office copy—ADVT.

Fifteen Years Ago

From our issues of December, 1919

Ault & Wiborg, Cincinnati, O., receive order from China, for $4,484,000 worth of indigo dyes. probably largest single order for dyes ever placed in the U. S.

Dr. Maximilian Toch addresses A. I. Ch. E., at Savannah, Ga., on the advantages of china wood oil in varnish.

Dr. Arthur D. Little, at same meeting, foresees large expansion of chemical industries in South, predicting that aluminum, coal-tar products, naval stores, and wood pulp will be developed from the chemical side.

Atmospheric Nitrogen, Manhattan, incorporated, capital of $5,000,000, for production chemicals and air products.

Monsanto constructing plant for manufacture of caustic soda and liquid chlorine on east bank of Mississippi, opposite company's present buildings.

Perkin Medal will be awarded this year to Prof. Charles F. Chandler, for his work in standardizing kerosene.

Nyanza Color & Chemical Co., Manhattan, incorporated, capital $60,000.

The First Steps Toward Profits

It is an old saying that "a knowledge of costs is the beginning of business wisdom," and at this season of the year the thoughts of the industrial executive turn naturally towards budgets. Most timely, therefore, is the publication in this issue of the first instalment of a series of articles telling in remarkable detail the budget experience of the American Cyanamid Company. Thoroughly convinced of the value of budget control, the management has permitted the man who planned their budget system five years ago and who today is operating executive of their budget control to set forth the forms they use, the methods they employ, the results of their experience, with the helpful purpose that their example, frankly portrayed, will be useful to other companies wrestling with budget problems. Our readers, we are sure, will welcome this most interesting and valuable series by V. R. Bechtel.